Vol. XXVII OCTOBER 1933 Number 10

EXCAVATING ENGINEER

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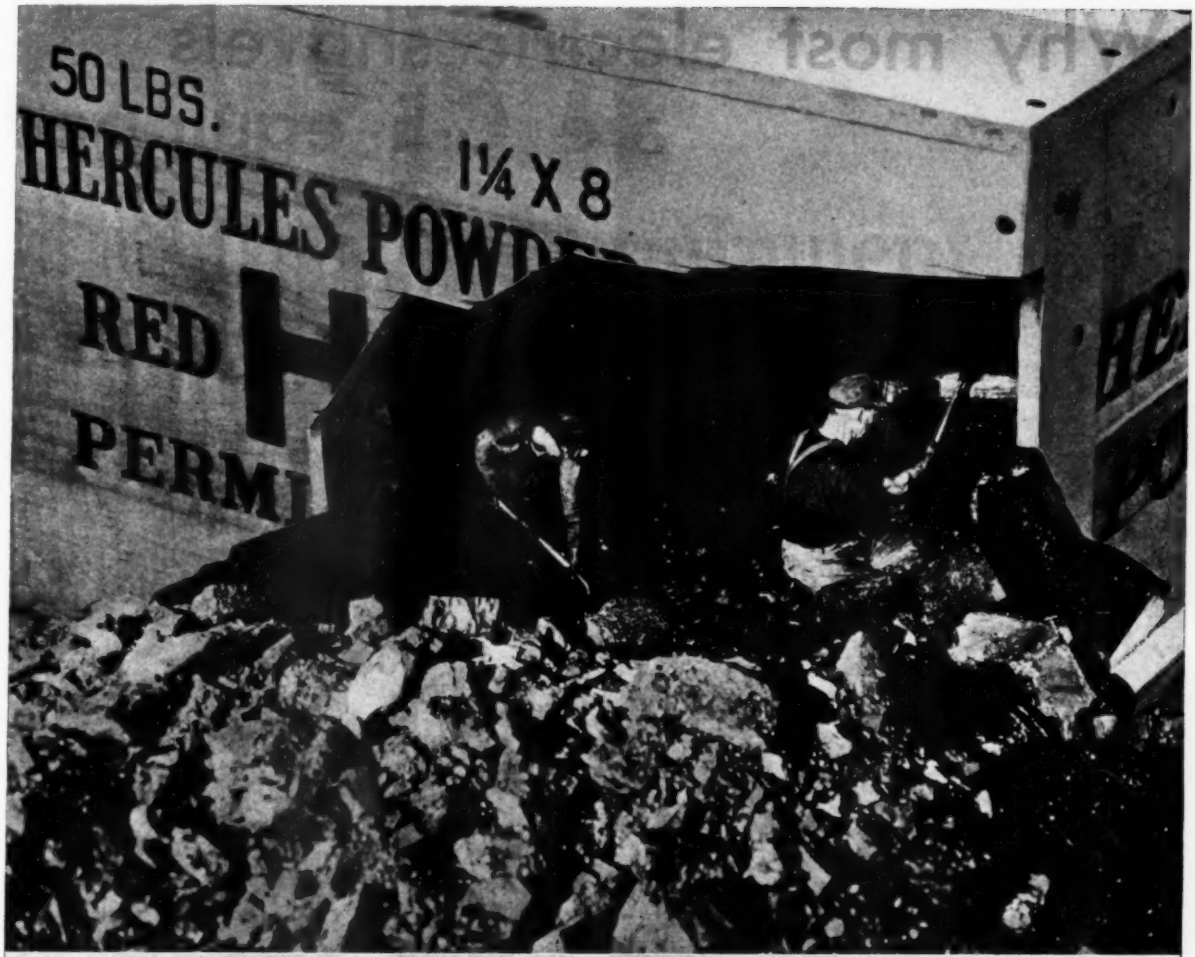

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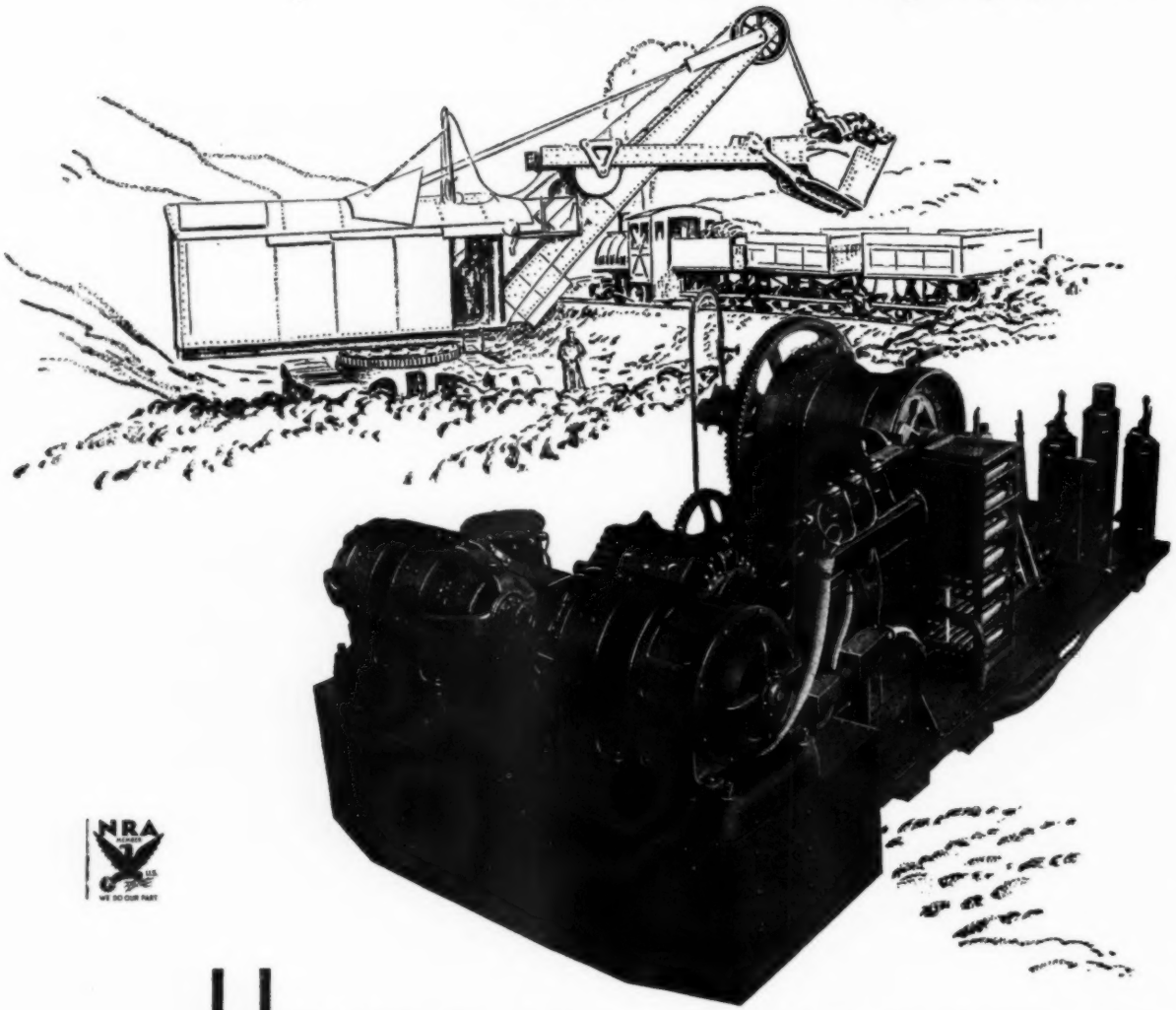

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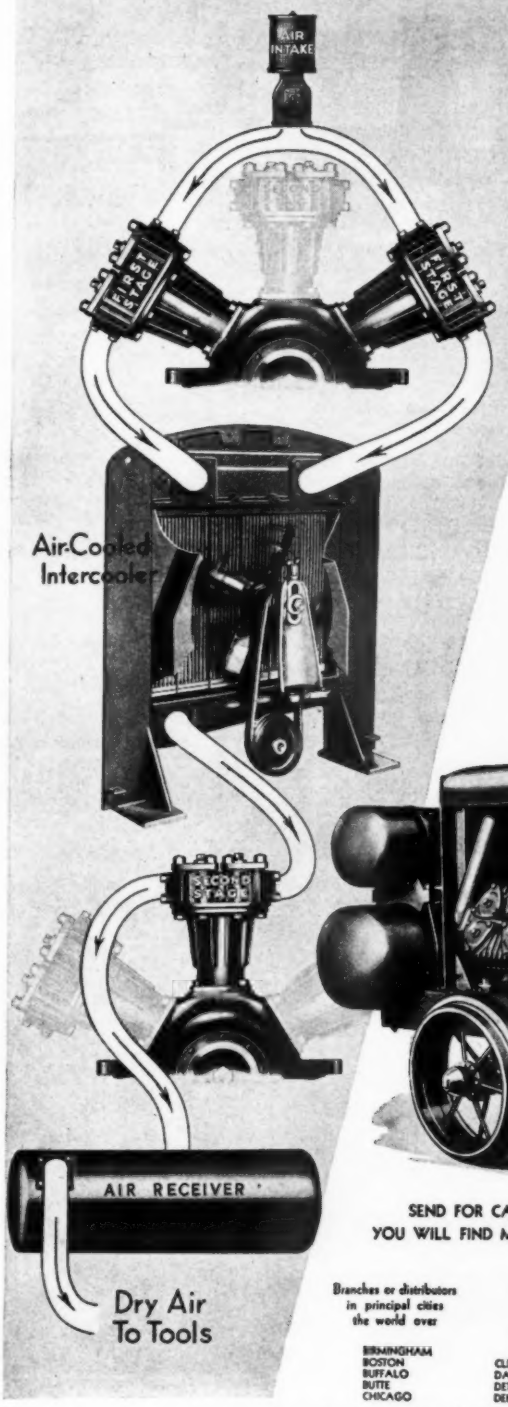

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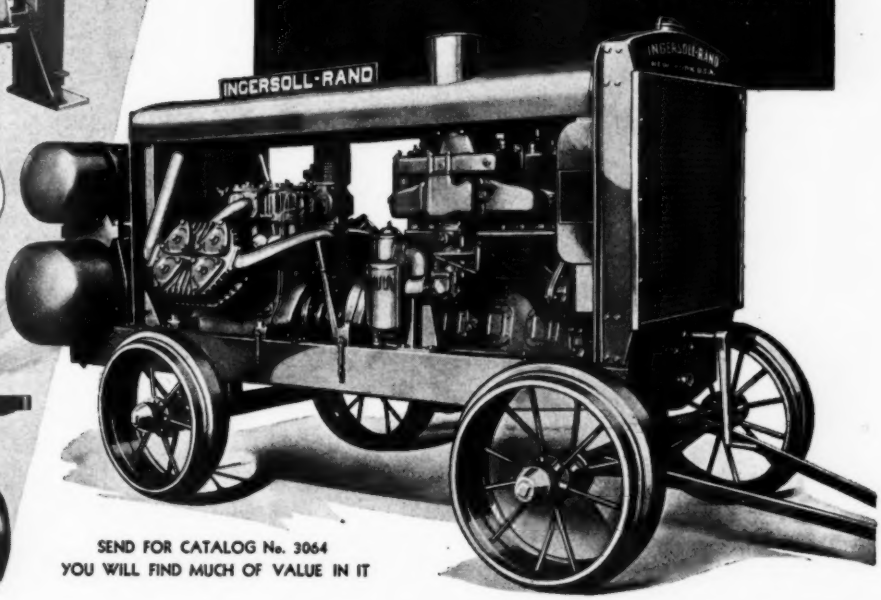

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Steel girders weighing as high as seven tons were placed at thirty-two foot radius. Below—General view of the Benning Bridge construction with the first stage well under way. The old bridges are seen in the background. To the right, rising above the city of Washington which may be seen breaking into the skyline, are the dome of the National Capitol and the Washington Monument.

EXCAVATING ENGINEER
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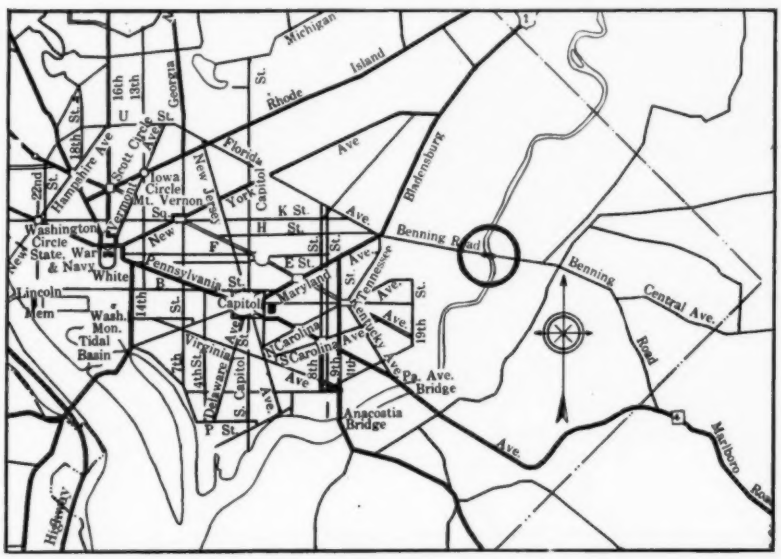
BUILDING A THREE STAGE BRIDGE IN STRIPS

Kaufman Construction Company develops interesting methods in building Benning highway-railroad bridge carrying capitol's eastward traffic.



The location of Benning Bridge is indicated by the circle. The boundary between the District of Columbia and the State of Maryland is shown by the broken lines on the right.

THE APPROACH to Washington from the east is over the Benning Road and the Commissioners of the District of Columbia have under way at the present time a program of widening and improving this road. The Kaufman Construction Company of Philadelphia has an interesting part in this program under its contract for replacing the bridges over the Anacostia River, which at this point is adjacent to the Benning Power Plant of the Potomac Electric Power Company.

Two old bridges replaced by new structure

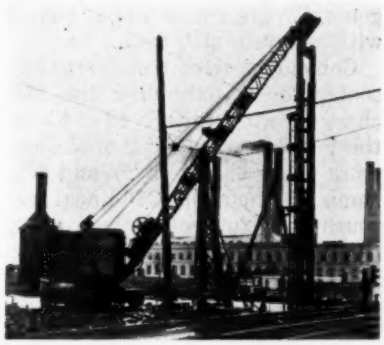
This river was formerly spanned by two bridges; a highway bridge carrying a 24-foot road and two six-foot sidewalks, and a two-track railway bridge belonging to the Washington Railway and Electric Company and carrying their cars to the North East District line as well as the trains of the Washington, Baltimore and Annapolis Railway to Baltimore and Annapolis. The main power lines of the Potomac Electric Power Company and also telegraph, telephone and water lines are supported on these bridges.

Both are deck girder bridges consisting of sixteen 25-foot spans and three 33-1/3 foot spans, making a total length of five hundred feet between abutments. The bents are steel posts and cross girders, resting on stone footings which in turn are supported on timber platforms and cribbing supported by wooden piles and stone fill. The abutments are of stone masonry on wood piles.

Work carried on without interrupting traffic

Owing to the importance of the traffic over these bridges as well as service of the public utility lines it was necessary in laying out this construction program by the District Commissioners to so schedule this work that none of the facilities would be interrupted.

The new structure was designed with this in view. It consists essentially of eight river piers, two abutments, and two bends on each side carrying the bridge



Pile driving . . . note special telescopic leads designed by Superintendent Rauterkus for use with 41-B cranes. Notice also the shovel crowding engine with cable drums at the heel of the crane boom for handling either telescopic leads or boom fall, also the construction at boom point where the leads are made fast to allow complete turn.

General view of construction operations as of February 6, 1933. The old bridges are shown at the left. Cofferdams, unwatering, form work and concrete operations are underway for the first stage piers in the foreground; pile driving at the right.

over the river, and two proposed future park drives.

The new bridge will have a total length of 541.5 feet from center to center of abutments and the general grade is about ten feet higher in elevation than the old structure. The total width inside of parapet walls is 104 feet, allowing for a 22-foot railway bridge, two 32-foot highways on either side and two eight-foot sidewalks. Two feet is allowed for curb walls between railway and highway sections.

All foundations rest on wooden piles cut off below low water, the piers, bents and abutments are of concrete and the spans generally are rolled girder beams with concrete slab deck.

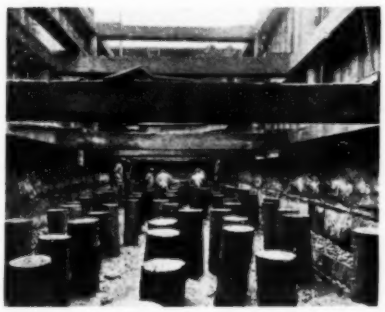
Coincident with this work, the contractor is extending the discharge water tunnel (8'x14') of the Potomac Electric Power Company under the roadway and continuing same about 250 lineal feet south to a future sea wall along the Anacostia River.

The construction program

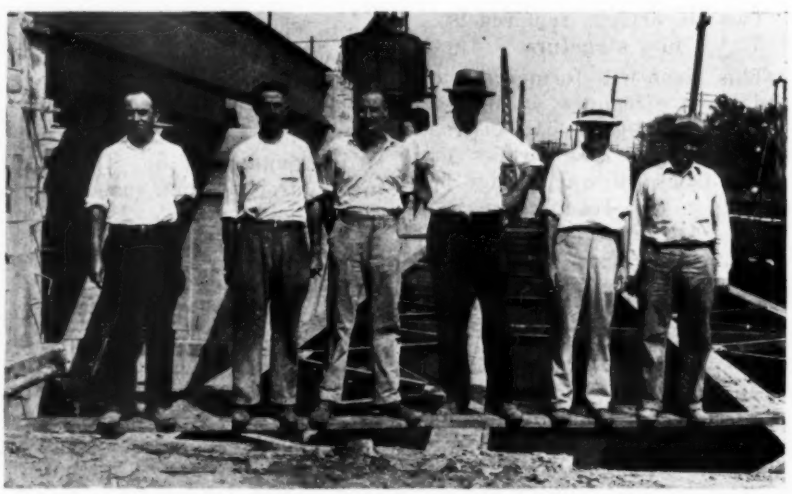
Bearing in mind that the new structure is really composed of three bridges, a highway bridge to the north and one to the south of the railway bridge, the first step was to build the highway section to the north of the railway bridge. When this was completed except for the deck, the railway company transferred its tracks temporarily to this north highway bridge so that the contractor could demolish the old and build the new railway bridge. When this is done the railway company will place its tracks in operation on the new railway structure and the Potomac Electric Power Company will lay its cables on the new highway bridge. The slab will be completed and paved and the north portion of the highway bridge will be placed in operation. Finally the old highway bridge will be demolished and replaced with the south highway portion of the new structure and the job will be completed.

Problems of plant layout

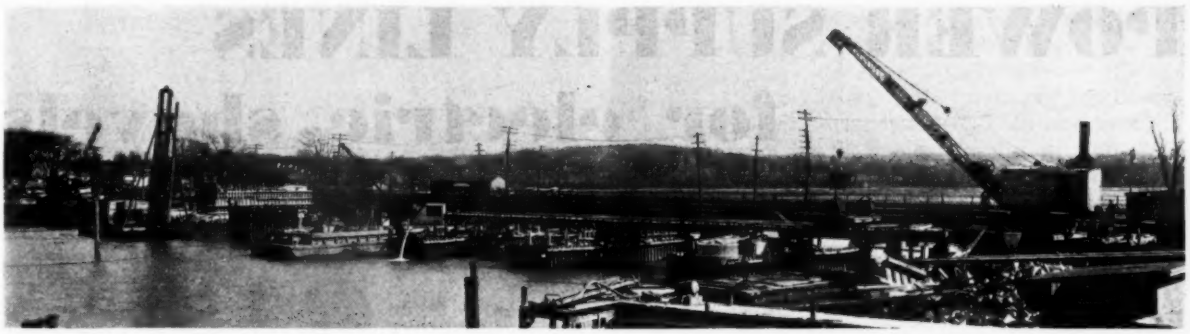
The Anacostia River has a maximum channel depth at mean low water of approximately seven feet. This depth does not extend clear across the river but for a distance of approximately 100 feet. This made the use of floating equipment possible for part of this work. However, at each bank or shore end it was necessary to build a temporary trestle on each of which a caterpillar crane did the work. Sixty per cent of the cofferdam and pier work was done from the water



Piles sawed off ready for pouring concrete. Note gravel drainage around outside. Also cut-off wall across far end to prevent water cutting under and into second stage cofferdam. The two lower sets of braces were removed after sealing. Design by Frank Fitzpatrick, Assistant Superintendent.



Some of the men responsible for the Benning Bridge Construction: (Left to right) Frank Fitzpatrick, Assistant Superintendent, James Sweeney, 1st Assistant Engineer, E. T. Johnson, 2nd Assistant Engineer, C. M. Rauterkus, Superintendent, A. B. Greene, Resident Engineer for the District of Columbia, Wm. Bell, Timekeeper.



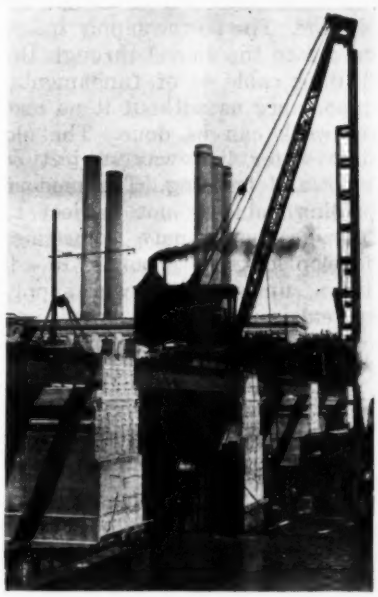
Loading car carrying 1-yard concrete batches out over temporary trestle. Pile driving operations underway at opposite end of bridge.

and the remainder from the trestles.

3500 wooden piles, 2500 linear feet of cofferdam required

Quite a bit of study was given to the choice of equipment to do the work, with the thought that driving piles and sheet piling were a major item in the work. There are about 3500 wooden piles and about 2500 linear feet of cofferdams.

The principle items of equipment being used are: two 41-B Bucyrus-Erie steam cranes, caterpillar mounted, with 50′ booms; one scow on which is mounted a Mead-Morrison one-half yard, gasoline, crawler crane for handling miscellaneous materials and dredging; another scow carries a rigid pile driver lead and two boilers furnishing extra steam for pumps and so forth; one Ransom and one Koehring one-yard concrete mixers; six centrifugal pumps, gasoline, electric and steam driven and varying from four inches to eight inches diameter; one 7B and two 9B McKiernan Terry steam hammers; concrete buckets; dump buckets and clamshell buckets.

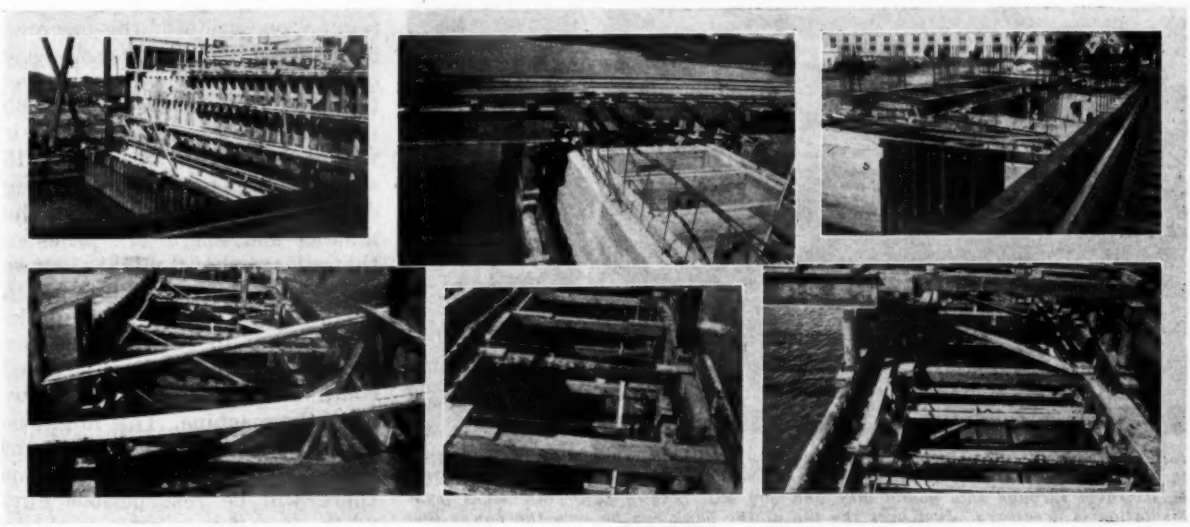


Telescope pile driver lead extended. Here the first stage piers are completed with wrecking of old structures partially completed. Work is starting on foundations for second stage piers.

The first two cranes do all of their work from the trestles and temporary steel structure and are just the proper machines for this work. They are well suited to perform all the principal steps of constructions; being used for excavation, pile driving, concreting and steel erection. The boilers are of ample size to furnish the steam necessary to operate the pile driving hammers and with the special telescopic leads designed by Superintendent Raterkus, permit the driving of piles in the equivalent of rigid leads.

The cofferdams for the first stage now completed are 54 feet

(Continued on Page 406)



Above, left and center—Concrete work on the piers. Above, right—Placing the deck on the newly completed first stage piers as viewed from the old railway bridge. Below—These three views show the bracing for the cofferdams.

POWER SUPPLY LINES for electric shovels

By D. STOETZEL

Industrial Engineering Dept., General Electric Co.

A FEW years ago, before the general introduction of electrically powered excavators to general mining and quarrying operations, when steam shovels were almost universally used, one of the major problems of operation was the maintenance of the water supply line. Of nearly equal importance was the maintenance of the fuel supply which, while it did not call for a definite supply line, did necessitate an almost unbroken chain of operations in moving the fuel up to the machine and aboard it and so on into the fire box. The maintenance of these essentials to steam shovel operation, while not particularly dangerous, involved careful planning and constant supervision and inspection.

With the advent of electric drive the water and fuel supply systems were eliminated and in their place the electric power supply has taken a position of major importance. This requires only one supply line, the trailing cable, being brought up to the machine and maintained in good condition. It is generally admitted among experienced operators that the maintenance on a trailing cable is of a minor nature as compared to the maintenance on a water supply line. The power supply transmitted to the shovel through the trailing cable is of fundamental importance as without it no useful work can be done. The old time water line was subject to leaks and freezing. The modern trailing cable is not subject to freezing but it may sometimes develop leaks or grounds. In addition, unless the power supply system is properly designed, any failures of this nature may involve considerable danger to operator or attendants.

Relation of Power Supply to Operating Characteristics

The satisfactory performance of the modern electric shovel depends on a number of interrelated characteristics. First, the machine must be fast and active but at the same time perfectly under the operator's control. Second, it must have ample torque or power to move the heaviest loads imposed upon it, within the limits of its mechanical strength, and to dig or cut through the bank under all reasonable conditions. Third, it must be capable of operating continuously during working periods without delays incident to repairs, maintenance, or lack of power. The power supply is important with respect to all three of these characteristics.

Landers-Morrison-Christenson of Minneapolis use this ingenious cable cart to carry the surplus cable behind this electric shovel in their sand and gravel pit.

An excavating machine of this kind presents a rather unusual type of load for the power line (see illustration). The operation is intermittent in many respects. Power demand peaks incident to regular operation of the machine occur at least once for each cycle of operation. For a large shovel this may be once every 45 to 60 seconds. For a smaller machine it will be as often as once every 15 seconds. In general, hard digging conditions tend to increase the number and size of the peaks so that a large shovel might run two or three peaks per minute and a small six or eight. These peaks usually run to between 200 per cent and 300 per cent of the rated continuous capacity or horsepower of the machine. This might be termed a high frequency type of intermittency. In most operations there will be rest periods anywhere from five minutes to thirty minutes or longer when the ma-

Inland Lime and Stone Company uses a stone boat to carry surplus cable behind their 5-yard electric shovel in their quarry near Manistique. Note how the cable must travel through this young lake and you will readily appreciate what good insulation is necessary. Just over the top of the bank can be seen the power line with the ground line carried on the top of the poles and the two power wires on the cross arm.

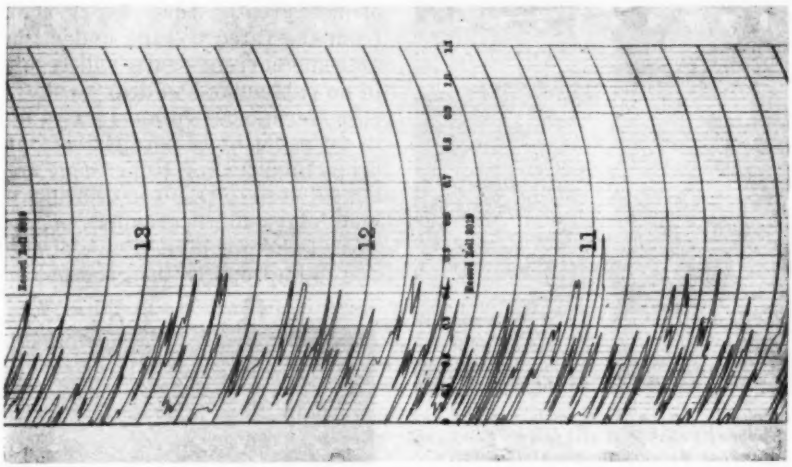


Chart showing power input to A.C. motor on motor-generator set on 1½ cubic yard electric shovel. Chart speed — six divisions per minute.

chine is idle waiting for empty cars to be brought up. This does not apply to the large stripping shovels used in open pit coal mines. For these there is a less important rest period, or at least partial rest period, when the machine is moving up into the work.

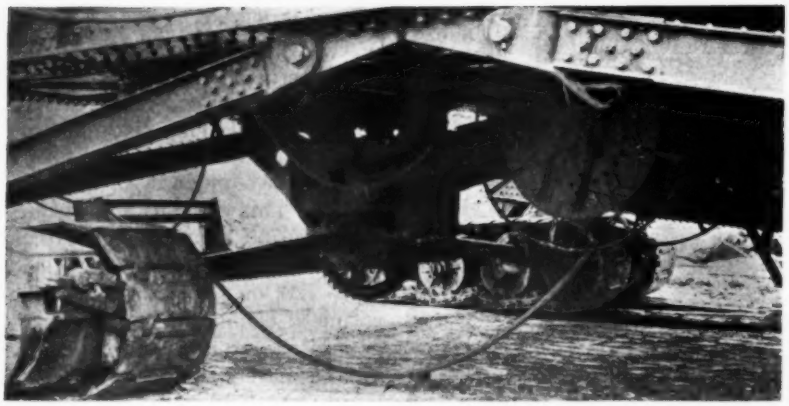
Electric cable behind this electric shovel connects with a power line at the right. This view was taken on the anthracite stripping operations of the Dick Smith Engineering Corporation in Pennsylvania.

On top of all this there is a seasonal variation in the operation of many shovels. This is particularly true in regard to quarries and some mining operations, as, for example, on the Mesabi range where little work is done in the winter. No doubt the most important feature of the load concerns the extremely high peaks during regular operation. Recording meter charts show that the load varies very rapidly from practically nothing to the maximum of 200 per cent to 250 per cent of normal, and intermediate variations less severe are about three or four times as frequent as these major variations which occur with each cycle of operation.

It will be found that for a given model or type of shovel the kilowatt hours used per ton does not vary as much as would be expected when the extreme variations in the nature of the digging are considered. In the case of a three cubic yard shovel in a stone quarry, we find that the power required is usually between .25 and .30 kilowatt hours per ton of material handled. This size machine will easily handle around 2500 tons per day under favorable conditions. This gives us a power demand of 750 kilowatt hours for a ten-hour day or an average load of 75 KW on the power line. The rating of the motor on the motor-generator set is 175 hp., having approximately 140 KW full load input, which gives us a factor of around 50 per cent to represent the proportion of the average load to the rating of the equipment. From the above it is evident that the capacity or rating of the electrical equipment for this class of machinery is usually determined by the extreme overload conditions rather than by the continuous or average load to be handled.

The effect of a number of shovels of similar size working in one location from a common power source is always beneficial as regards improving the load factor, as there is little tendency for the extreme peaks to occur at the same time and the ratio of average load to peak demand is increased so that proportionately less generating equipment or less line capacity is required.

The effect of a number of shovels working from a common power source is beneficial as regards to improving the load factor. This illustration shows, at the United Electric Coal Company's operations, a number of machines with cables carried up the bank to the right to reach the electric power system.



Many of the big stripping shovels carry electrically driven cable reels beneath the base. This shows such a reel on one of the Bucyrus-Erie 750-B strippers. The cable passes out through a guide mounted on the rear axle as shown at the left.

Power Line Requirements and Characteristics

The first point to be considered in designing the power supply system for a shovel or a similar excavating machine is the voltage. This depends somewhat on what is available and also on the size of the machine in question. Where the desired operating voltage is not directly available it will be necessary to use a bank of step-down transformers to provide 4000, 2300 or 440 volt power. 440 volts is suitable for the smaller sizes of electric shovels. 2300 volt power supply is used for shovels of from two to five cubic yard capacity. For the extremely large sizes 4000 volts is commonly used, although in some cases 2300 volt power supply has worked out quite satisfactorily.

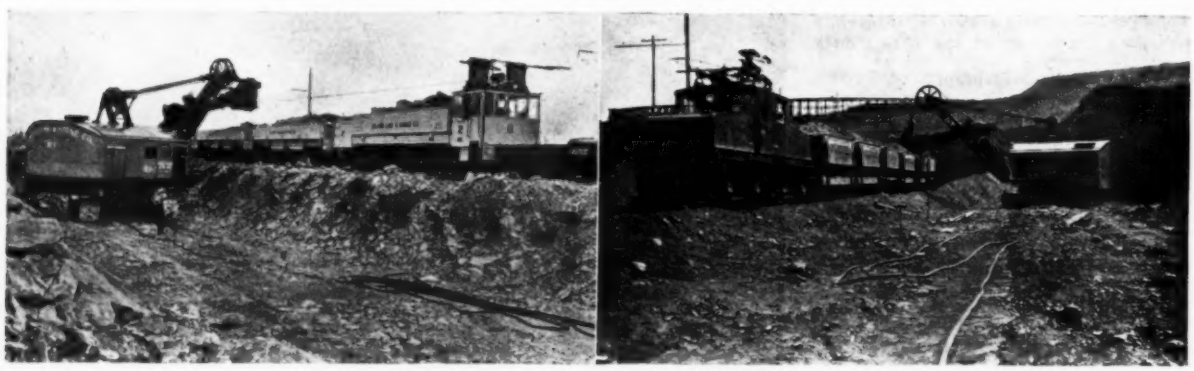
Another point to be considered is the layout of the mine or quarry and the general nature of the work. This determines the length of the trailing cable. In general the greater the length of trailing cable required, and the greater the distance the power must be brought from the transformers by means of overhead pole line to the point where the trailing cable taps on, the greater the benefit to be derived from higher voltages.

In order to secure optimum operating characteristics from electric shovel equipment, careful consideration must be given to the primary source of power, the design of the secondary transmission line, the trailing cable, and the transformer equipment. Information regarding the size and number of shovels involved will permit a rather close approximation of the peaks which will be encountered and from this it will be possible to determine the size of the conductors to transmit the power without undue voltage drop. Voltage drop at the shovel, of not greater than 5 per cent from the rated voltage under the extreme current peaks will result in no particular handicap to shovel performance. In most cases up to 10 per cent is permissible but drops in excess of 10 per cent are almost sure to result in difficulties and relays in the regular operation of the machine. Low voltage due to improperly designed power supply systems is probably the most common cause of complaints in regard to electric shovel operating characteristics.

A. C. switchgear equipment for use on 4 cubic yard electric shovel.

Short-Circuit, Overload and Undervoltage Protection

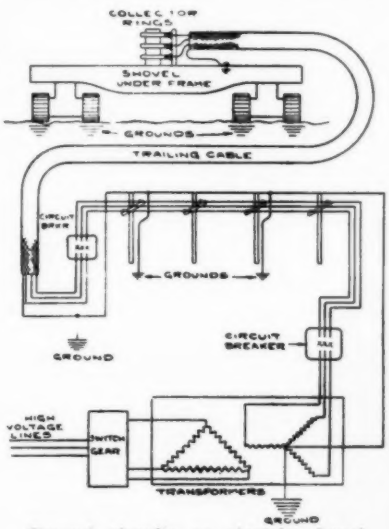
In connection with the whole power supply system the subject



Left—Here is another Inland Lime and Stone Company electric shovel with the equipment using the accordion pleat system to save wear and tear on the insulation in dragging the cable behind the shovel. The trolley poles in the background cast into heavy concrete blocks at the base and are readily moved whenever the track is shifted. Right—Interstate Iron Company have this iron ore pit at Virginia, Minnesota fully electrified. Cable service in the iron mines is about as severe as most quarry service.

Left—In the background may be noted the electrical power lines used by the Kansas Portland Cement Company of Bonner Springs, Kansas in maintaining their power supply for the three yard electric shovel in the foreground and other electrical pit equipment. Center—A Michigan quarry uses a stone boat to carry the surplus electric cable behind this 5-yard machine. Electric cables for the drills may be seen extending to the right along the top of the bank. Left—A pair of wooden horses like that at the left carry this three part cable over the tracks at Verplanks quarry of the New York Trap Rock Corporation.

of suitable protection against overload and undervoltage conditions is an important one. It is desirable to maintain the power supply as far as possible under even the most extreme conditions, but on the other hand it is desirable to protect transformers and power lines from damage



Ground circuits on electric shovel power lines.

due to excessive loads or due to grounding or similar abnormal conditions.

The protection on the shovel consists only of an undervoltage device which will prevent restarting of the equipment after a voltage failure until the operator is definitely ready to proceed (see illustration above). No overload relays are used on the shovel equipment itself.* Sometimes disconnecting switch type line fuses of relatively high capacity are used on the power lines coming into the shovel when these are of a higher than usual voltage rating. These are intended to provide merely a convenient method of disconnecting the power lines from the primary control equipment and to provide short circuit overload protection.

At the point where the trailing cable attaches to the overhead line there should be overload protection provided by means of an oil circuit breaker but this device should not incorporate undervoltage protection as the location is usually such that it would cause considerable hardship to reset after a power failure, and power failures of short duration may be a rather frequent occurrence. The overhead lines, at 2300 volts, or whatever voltage, is being used, will usually go back some distance to the transformers, although there are some cases where the high voltage (something in the nature of 33000 volts, for example) will be brought close to the pit and the trailing cable attached directly at the transformers. In any event there should be an overload breaker at the transformers and here again undervoltage protection is not desirable. Going back along the power line to the power station or substation one finds the usual overload protective devices.

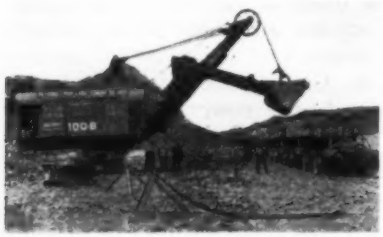
Here is the way West Slope Construction Company handles the power lines and cable connections to their electric draglines on San Gabriel Dam No. 1.

*Editor's Note: The M. G. Set starting loads are usually greater than shovel running loads hence only protection of any particular value is short circuit protection which should be back in the distribution system. Also protection should be provided at pole line to protect trailing cable as anything on shovel will not do this. With protection on pole line there is no need of protection on the shovel.

Lightning arresters are not usually used on excavating machinery of this kind which is generally a completely grounded all-steel structure. Phase reversal protection is not usually provided in the control equipment as the direction of rotation of the motor-generator sets, both main and exciter where used, would be the only features affected. It is understood by operators that the direction of rotation of the sets should always be in the same direction and it is standard practice to make a check after any changes in the power line connections to see that this is the case. No serious damage would result from operation in the wrong direction but changes in characteristics of the generating equipment would indicate very quickly to operators that something was wrong.

Grounding

The importance of installing and maintaining proper ground connections on electric shovels



Here is another type of stone boat and a clever folding tripod made out of two-by-fours used by the Petoskey Portland Cement Company of Petoskey, Michigan in maintaining their electrical connections.

and drag lines is not as universally recognized as it should be. Serious consequences to operators and attendants may result from improperly grounded and unprotected power supply system.

In cases where the transformers supplying power to a shovel are delta connected on the low tension side, there will be no grounded neutral point (unless an auxiliary Y-connected grounding transformer bank is used) and there will be no opportunity to make use of a ground return wire with the positive protection it affords when properly installed. The best protection would appear to be frequent testing and inspection with the idea of discovering and remedying any fault in any phase at the earliest possible moment. In this connection ground detector equipment would be warranted.

The majority of the systems supplying power to electric shovels at 2200 and 4000 volts make use of Y-connected transformer secondaries, in which case it is almost certain that the Y point will be solidly grounded at the transformers. From the transformers a pole line transmits the power to the shovel trailing cable. Other loads may be fed from this same line. In any event, there should be a ground wire of ample capacity running parallel to the three power wires. For best protection from lightning discharges it is advisable to locate the ground wire *above* the power wires and at such a height that lines drawn between centers of outside conductors and center of ground wire would lie at angles of approximately 45 degrees from vertical. At every second or third pole and at the point where the trailing cable joins the pole line the ground wire should be connected to a deep driven ground rod (see diagram.) In some few cases the shovel trailing cable will take off directly at the transformer bank. Of course, this eliminates the pole line with its attendant grounding circuit. However, the thorough grounding of the Y point must be maintained.

A ground return conductor of ample capacity (cross section of copper should equal cross section of any one of the three conductors) should be included in the trailing cable. A convenient method is to provide fine copper gauze corona sheating over each one of the three insulated main conductors and use these as the fourth conductor or ground return. This keeps down the size of the cable, increases the flexibility and makes the cable less expensive than one with four insulated conductors. In addition, the corona sheath equalizes insulation stresses, protects against deterioration of rubber insulation and wearing surface by corona action at high voltages and high altitudes, and provides protection to workmen and others handling cable or otherwise coming in contact with it. It is essential that the ground

The electric power line for the shovel equipment in this New York Trap Rock quarry may be seen in the background. The connection is on the pole at the top of the bank and the cable leads down the bank and along the floor of the quarry to the three-yard electric shovel in the foreground.

return wire be solidly grounded to the shovel frame at the one end and to the neutral or Y point of the transformer bank and the grounding rod at the other end and that the conductor be continuous and in good condition throughout. In case the cable is broken or cut through, accidentally or otherwise, particular attention should be given to making a solid and substantial splice on all of the ground return conductors as well as on the main conductors. The ground return circuit must be well and completely maintained at all times.

Overload protection installed at the transformers and at the pole line end of the trailing cables as outlined in the foregoing should be provided by means of three direct acting trips on circuit breakers with a fourth direct acting trip operating from a relay in the neutral or ground circuit. This will be set very low so as to operate in response to any unbalanced conditions due to grounds on the system. This will make it impossible to operate until grounded conditions existing on any part of the electrical equipment or power transmission system have been corrected.

Mining Baukol Noonan Lignite

General view of the pit. Note the clean surface of the coal. This is further cleaned by sweeping with brooms just ahead of the loader.

Highest quality of product and most efficient and economical production secured by modern plant at North Dakota Mine.

ON their property of 1040 acres near Noonan, North Dakota, Baukol Noonan Lignite, Incorporated, has a vein of high grade lignite varying in depth from 7 to 9 feet. Overburden averages about 30 feet in depth. The vein has, for a number of years past, been worked by small underground mines in the vicinity and the quality of their product created a demand among dealers for a larger production of this particular grade of lignite. In answer the new open pit mine with its modern preparation plant came into being and the first shipment went out December 8th, 1930.

Ingenious dumping device over the tipple hopper.

No expense was spared in installing and fitting the plant with the very latest and most modern machinery. The company was organized by Harris Baukol, who is now its president and one of the directors. L. L. Munson, who formerly was manager of a large strip mine in the bituminous field, is vice president and treasurer, and he is also in charge of operations of the plant. C. Cothrein, who also came from the strip mines in the state of Kansas is secretary. Wm. Vadnais is manager of sales in the office at Noonan. A. M. Baukol, Grand Forks, has charge of sales in Minnesota and eastern North Dakota. F. M. Baukol, Devils Lake, has charge of sales in central and western North Dakota. All are experienced strip miners and every effort has been made to secure the highest possible quality of product and the most efficient design and arrangement of plant.

Bucyrus-Erie 225-B stripper and 50-B loader handle excavation

The pit is laid out to be worked in the shape of a fan with the tipple at the lower end located a half mile from the Great Northern branch line Berthold to Crosby. Pits in the upper part of the fan are excavated by a Bucyrus-Erie 225-B steam stripper.

After the overburden is removed the greatest care is used in cleaning the face of the coal so as to make sure that there are no impurities loaded into the cars. Modern machinery is used in this process in cleaning the coal, but as a last precaution every inch of the face is swept with stiff brooms to remove every particle of dust from the surface.

After the coal has been thoroughly cleaned, loading of the coal into small pit cars to be transported to the tipple at the lower end of the fan is started. A Bucyrus-Erie 50-B electric with 2¼-yard coal bucket loads the coal. The pit cars manufactured by the Koppel Industrial Car and Equipment Company, Koppel, Penna., are of all steel construction with a four to five-ton capacity. Two 16-ton Plymouth gasoline locomotives are used in hauling the coal from the pit to the tipple. Each locomotive pulls ten loaded pit cars operated over a 36-inch gauge railroad laid with 45-pound steel.

Accurate screening important

When coal arrives at the tipple it is dumped into a hopper and the preparation for shipment is underway. To meet the critical market that now prevails modern preparation equipment has become a necessity. The most modern screening facilities possible, therefore, have been installed for

the preparation of the Noonan Coal. This tipple was built to order by the McNally Pittsburg Mfg. Company, Pittsburg, Kansas, who make a specialty of this kind of equipment.

The freight rates are high on coal. The same freight rate is charged on a poor grade of lignite and a poor preparation. The lignite buyer balks at paying for something he is not getting and insists that his coal must conform to specifications. The only insurance for a uniform product which at all times will give satisfaction is a screening plant with modern machinery.

Center: Harris Baukol, President and General Manager. Left: L. L. Munson, Vice-President, Treasurer and Superintendent. Right: C. Cothrein, Secretary and Assistant Superintendent.

Electric Control in Tipple

The tipple at Noonan is a "four-track" arranged to load four grades of coal at the same time. It is operated by electric power and the power is dispensed by a man stationed at the control house. The shaking screens are ten feet wide and about 60 feet long. As the coal passes over this shaker, all the screenings are first taken out, dropping through holes and through a chute and unto the screenings loader. Slack is removed and dragged away from tipple and burned. Screenings, nut, egg and lump fall through perforated holes according to size. The cars under the tipple are loaded and dropped out to be weighed by a bonded weighmaster. Doors are closed, seals and labels applied and the coal is ready for shipment. Nearly all the coal is loaded in box cars which are carefully cleaned before the coal is put in. For some steam plants open gondolas are used. The capacity of this plant is 3000 tons per day, approximately 100 cars in a ten-hour shift. All the box car loaders were installed by the Ottumwa Box Car Loader Company, Ottumwa, Iowa. Connection is made with the Great Northern Ry. Co. a short distance north of the tipple and tracks running into and out of the tipple have been arranged to provide a natural 2 per cent grade to take care of movement of loads and empties. Just below the tipple an up-to-date Fairbanks-Morse S-type track scale weighs the loads accurately.

Big lumps broken with double roll breaker

Open pit loading with shovels has brought about a mechanical device for the purpose of breaking up the excessively big lumps. These large lumps are a menace to the machinery on the tipple and also they are not wanted by the dealers and result in complaint from the coal buyers. A Pittsburg double roll breaker was installed to meet this demand. It is so arranged that it will break the large lumps and still cause the smallest amount of degradation. It operates with comparatively low speed and the rolls are quickly adjustable from 4 inch to 21 inches. The general trend of the domestic users is to demand the smaller and more uniform sizes of coal and by using this breaker the plant is equipped to give the dealers such a preparation.

"Round" house and Plymouth locomotives. A Caterpillar 20 with bulldozer is used for clean up, track grading, etc.

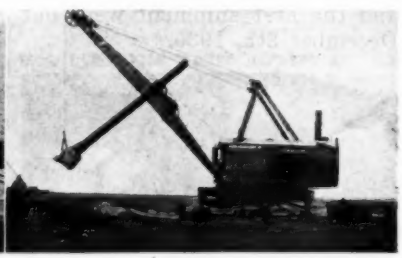
No blasting necessary

No blasting is required in the pit. The loading shovel digs the coal from the solid vein without any help in loosening the coal by the means of shooting. The overburden is also of a character that is easily dug by the big stripping

(Continued on page 406)

Supplying coal and water to the stripper keeps a number of men busy. Overburden averages 30-ft. and is dug without blasting.

Loading out the first coal before an enthusiastic audience. The Bucyrus-Erie 50-B electric digs the coal without blasting.



Ready to start stripping with the Bucyrus-Erie 225-B steamer. She carries a 6-yard dipper, an 85-foot boom, and moves on trucks.

Warren A. Bechtel, Sr.

ON AUGUST 28th at Moscow, Russia, Warren A. Bechtel, Sr. passed away. The press of many nations recorded the death of the President of Six Companies, Inc., builders of Hoover Dam, the largest structure of its kind yet attempted by man.

Those who knew him could not help but feel disappointment that in reporting his achievements greatest stress was laid upon his success as a builder. Many enduring monuments in the shape of railroads, highways, dams, tunnels, bridges and pipe lines pay silent tribute to Warren A. Bechtel, the constructor. But of even greater note were the achievements of Warren A. Bechtel, the man. He earned the undying loyalty of his associates, employees and innumerable friends because he gave to them unwavering loyalty with a simplicity and kindliness of manner that was unchanged from the days when he started his construction career as a (pick and shovel) railroad builder. He had intense pride in good workmanship and, as a prominent railroad executive, who had known him for over 20 years, said, "No engineer had to go after Bechtel to do a good job." His scrupulous honesty, tremendous vitality and never failing industry earned the admiration of all who knew him. His keen sense of sportsmanship and his enthusiasm gained the love and respect of thousands who worked under the genius of his leadership.

Mr. Bechtel was born on a farm near Freeport, Illinois on September 12, 1872. When he was 12, his family moved to another farm near Peabody, Kansas, which was then a frontier state. Here he continued with his farm chores, attending school during the fall and winter. As soon as he was old enough he worked with neighboring ranchers during vacations as a farm hand and also as a cowboy. He graduated from high school at 19 and continued as a farm laborer (except for a short venture as a trombonist with an

unsuccessful musical troupe) until 1897 when he married Miss Clara West of Cincinnati and the newlyweds set out for themselves to raise corn and feed drought steers on a place of their own. But it was a bad year and when the season was over all the young couple had left was 14 mules. With these Mr. Bechtel hired out to a contractor grading the new lines of the C. R. I. & P. west of Chickasha receiving $2.75 per day for each team and driver. He continued on similar work through Iowa, Minnesota, Wyoming and Nevada, saving enough of his earnings to pay off the debt on his old farm.

Offered a foreman's job on the Southern Pacific at Reno he sold his teams and landed there with his wife, two sons, a sewing machine, a battered slide trombone and ten dollars, but he found there was no job. Undaunted, he looked around and secured a position as estimator for the S. P. at Wadsworth, Nevada for which he received $59.00 a month. He worked up to more important railway construction jobs and managed, by pinching pennies, to accumulate a capital of $1500. With this he launched out as a sub-contractor on excavation, sticking chiefly to railroad construction.

In 1900 he took a sub-contract from E. B. and A. L. Stone on construction of the Western Pacific main line in California. Later as sub-contractor for the Utah Construction Company he was on the Southern Pacific's Natron cutoff in Oregon, the Oakdale Irrigation District canal in California, and the Northern Pacific Railroad construction through the Eel River canyon in California. On this project (1909-1913) the various contractors were required to build, through their sections in the canyon, a rough wagon road for movement of equipment and supplies. Four and six-horse teams were usually used for hauling but Mr. Bechtel successfully pioneered the use of motor trucks for this work in spite of the skepticism of fellow contractors and engineers.

In 1914 he became an independent contractor and during the 19 years that followed was identified with many heavy engineering construction projects, some of international note and aggregating about $90,000,000 in value.

At the time of his death Mr. Bechtel was president of the Six Companies, Inc., an association of six leading organizations formed for the purpose of building the $49,000,000 Hoover Dam; a director of Bridge Builders, Inc., holders of a $5,000,000 contract for the East-Bay piers of the San Francisco-Oakland Bay bridge; director of Utah-Bechtel-Morrison, Inc. on a $2,000,000 contract for grading, tunnels and structures on the 38½-mile Dotsero cutoff of the Denver and Salt Lake Western Railroad in Colorado; director of Bechtel-Kaiser Co., Ltd. & Henry J. Kaiser Co. on a 216-mile natural gas pipeline for the Western Gas Co. from Douglas to Phoenix, Arizona; president of the W. A. Bechtel Co., engineering contractors of San Francisco; and chairman of the board of Bechtel-Kaiser Rock Co., operators of a concrete ag-

(Concluded on next page)

gregates and railroad ballast plant at Oroville, California.

In 1928 Mr. Bechtel was elected president of the Associated General Contractors of America and gave this organization a splendid administration. He continued active in this organization, particularly in the Northern California Chapter of which he was a past president and a member of the board of directors. He was a member of several Masonic bodies and the Elks Lodge. He was also a member of the Engineers Club, Commonwealth Club, Press Club, Stock Exchange Club and Masonic Club all of San Francisco.

He is survived by his widow, Clara; a daughter Alice; three sons, Warren A., Jr., Stephen D., and Kenneth K.; and a brother Arthur V. Bechtel, the latter having been associated with him in business the last 35 years.

Through all his triumphs Warren A. Bechtel remained the fine and unspoiled western contractor of the old school, rugged, democratic, kindly, with the keen vision and self-reliance which enabled him to take his place as an outstanding American and one of our most successful contractors.

Building A Three Stage Bridge In Strips

(Continued from page 397)

The 41-B cranes traveled over the newly laid girders on mats as illustrated here.

by 16 feet with a depth from mean high water to sub-grade of 16 feet. The specifications in the contract permitted sealing under water, but the contractor elected to unwater and seal in the dry. Three sets of timbers were framed above water and then sunk into place. Thirty foot steel sheet piling was then driven, the dam unwatered, piles cut off, a cut-off wall driven across the cofferdam to permit the adjacent cofferdam of the second stage to be unwatered, a gravel drain built around the peremiter of the cofferdam to keep it dry during sealing. The second stage cofferdam will be 20 feet by 22 feet and the third stage will be 54 feet by 16 feet.

Work was started November 10th, 1932 and will be completed June 15th, 1934.

In charge of the Benning Bridge construction were: for the District of Columbia, C. R. Whyte, Chief Engineer of Bridges; for Kaufman Construction Company, C. W. Rauterkus, Superintendent.

Always bear in mind that the lowest step of a ladder is as useful and necessary as the highest.

Mining Baukol Noonan Lignite

(Continued from page 404)

shovel without any blasting. Some rock formation is encountered at times but none that the shovel cannot readily dig.

In order to take care of the extra load demanded of the power company it became necessary for the Montana-Dakota Power Company to change over their line. The load was changed over from a 13,000 voltage to a 33,000 voltage so as to have the power needed.

One mile of spur track leading from the Great Northern Railway Company to the tipple was laid with 80 lb. steel the same as used on the lines of many of the railroad companies. The promoters of the company realized that in years to come millions of tons of Noonan Coal would be moved over this track, and the track was built in such a shape as to stand the heavy traffic that would pass over it. The same policy has been used in the construction of the entire plant. The very best material and workmanship has been incorporated throughout.

Four tracks under the tipple carry the various sizes of coal to the scale. A long conveyor running out over the dump track trestle takes care of the waste.

Old Times & Old Timers

Old Timer Walton tells about a Bucyrus from Bucyrus, Ohio

COMMENTING on the old "49" illustrated and described by Old Timer Inch in our March issue, Old Timer R. A. Walton of New Freeport, Pa., writes that he thinks that this machine was an improved "A" Marion. Mr. Walton continues; "I was on this shovel myself in 1900 while I was firing the Bucyrus working in Iron Belt. At that time this Marion belonged to the Wisconsin Central Railroad.

"The accompanying picture is of a Bucyrus shovel built in Bucyrus, Ohio and one of the first shovels built by that organization. The plate showed that it was patented in 1880 and gave no later dates. At the time this picture was taken in 1910 it belonged to the Phillips Lumber Company of Phillips, Wisconsin. The writer was the engineer but I don't remember the name of either the craneman or the fireman. We were loading gravel to ballast their line of railway. They didn't use a ledgerwood to plow the cars but just hooked a cable to the cars and the engine did the best it could to pull the plow through. At the time this picture was taken the boiler on this shovel carried 120 pounds of steam. Am now employed by Donatelli and Donatelli on a Bucyrus-Erie 1035 straight gas shovel. There is sure some difference between this machine and the old timer which I handled for the Phillips Lumber Co."

Thank you Old Timer Walton. Can any of our old timers tell us what became of this old Bucyrus which Mr. Walton operated for the Phillips Lumber Company in 1910? The machine must have been close to thirty years old at that time and we are wondering how much longer it continued in service.

And C. G. Jackson tells of "Old Sammie"

"WELL, here she is. Most all the old timers have been asking about this old wheel-type machine. This machine was built by the Vulcon Iron Works. She was owned by the North Georgia Iron Company about 25 years, then the Woodstock Iron Company got 'Old Sammie' and used her for 8 years. I claim that's the best record that can be found on this shovel.

" 'Old Sammie' was 22 years old when this picture was made in 1906. The engineer was 'Bud' Kennedy; craner H. B. Minton; fireman 'Rabbit' Rustin; 'Dad' Little, Walking Boss; J. C. Lyle, Walker No. 2 Mines, three pitmen are also shown in the picture.

This machine was noted for the great strength it had. All the runners would get around and tell what these old timers would do. But 'Bud' Kennedy was called the crack runner. He could load a train of 8 2-yard cars in about 25 minutes if he did not get out of oil.

"This old shovel had a hand oil pump on it. The fireman had no peace, all you could hear was 'Rabbit, give 'er a shot.' The fireman would give her the shot with black oil, chain dope or anything that was hot. The water tank was a 50-gallon barrel. If the tank went to leaking you just

(Continued on page 429)

EXCAVATING ENGINEER

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The Business Situation

IT IS A VERY COMMON mistake to be overly optimistic during the last stages of a boom and during the first stages of a depression. It is also a very common mistake to be overly pessimistic during the last stages of a depression and the early stages of an improvement in business. Not that our mental state is steady or immune from fluctuation, but rather that the violence of the pessimistic reactions is greater than the optimistic ones during the final stages of depression and just the reverse during the final stages of a boom. At the height of a boom each little set-back is written down as insignificant, each advance as part of the general scheme of things; any thought of reversal is promptly banished from the public mind. At the end of the depression we have just the opposite psychology. Every little readjustment is viewed with serious alarm as the possible beginning of a toboggan slide carrying us further into the depths of maladjustment. Every up-turn is looked upon with suspicion as but a temporary change without lasting benefit.

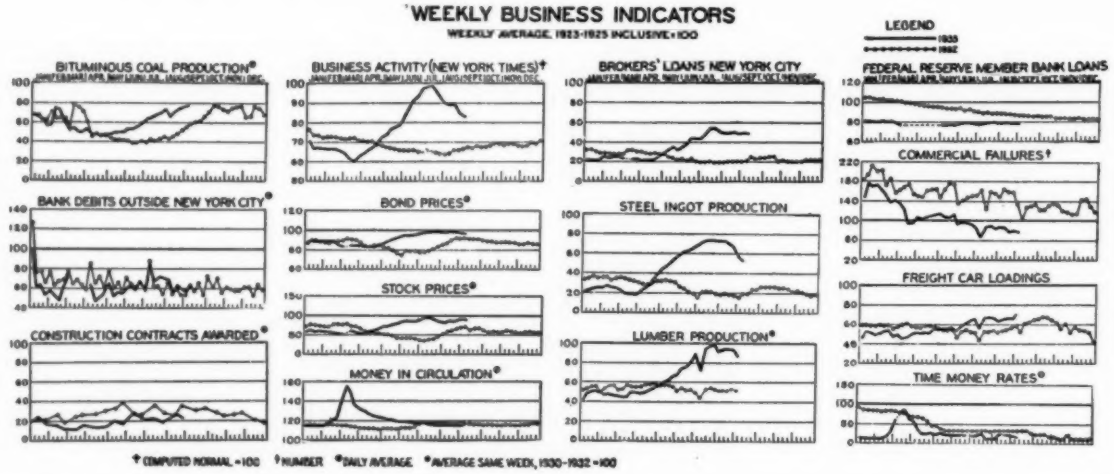
As this is written we are passing through one of the secondary readjustments that are bound to occur from time to time as the business curve turns upward to a more nearly normal position. As we have pointed out before, almost every factor points to accelerating the operation of that interesting cycle which runs "greater production, more purchasing power; more purchasing power, greater production," and so forth.

Following the ironing out of our financial difficulties in March, it was only natural that production should increase to top speed, partly because of some accumulation of orders and partly because of the threat that cost of production would be higher in the immediate future. Wholesalers and retailers both increased their sales by warning the public of the danger of increased prices. Having increased their sales, they took heed of their own warning and purchased other stock to protect themselves against price rises. It was only natural that this activity should have run too far and only natural that the reaction should take place. It will be noted that the curve for business activity reproduced herewith shows a rise from 60 to 98 from the middle of March to the middle of July — an increase of 63% in less than four months. The reduction that has taken place as of the first week in September, brings the curve back to about 83, the equivalent of 38% increase in business activity since March 1st.

There is another point on which statistics do not appear to be available at the present moment and which may prove to be a very vital factor in recovery. From casual observation it would appear that our housing needs were taken care of at the present time well enough so that there is little possibility of an immediate large increase in building activities. But probably the present appears deceptive for many families have doubled up in their accommodations, many city dwellers have returned to live on farms enjoying, perhaps, the hospitality of some relative but also temporarily crowding one type of shelter. As business improves and the means are available, those families who have combined under one roof, will again seek separate lodging. It is very probable that while the foundation for a large amount of building activity is not in evidence today, a substantial demand may make its appearance with surprising rapidity as business activity increases, for the rate of increased population has not suffered any great reduction.

The same thing very probably holds true in regard to roads and highways. It will be remembered

WEEKLY BUSINESS INDICATORS



that in 1928 and 1929 roads were always crowded and in many sections of the country it was a positive burden to travel by automobile. Today the same congestion does not exist. It seems as if, for once, the balance between roads and vehicles were reached. It seems as if, with the great decrease in automobiles and the increase in the mileage of roads built in the last few years, our road systems were adequate for the travel demanded. However, one only needs to study the automobile sales curve for this year to realize that good business will bring hundreds of thousands of automobiles back on roads again, will greatly increase the sale of new machines. The highways undoubtedly are ample for the needs of today, but we have taught millions of people the convenience of automobile transportation and when the money for operating expenses again reaches them the highway system will unquestionably again be overtaxed.

"Potts was a great man. At his death three towns were named after him: Pottsville, Pottstown and Chambersburg."

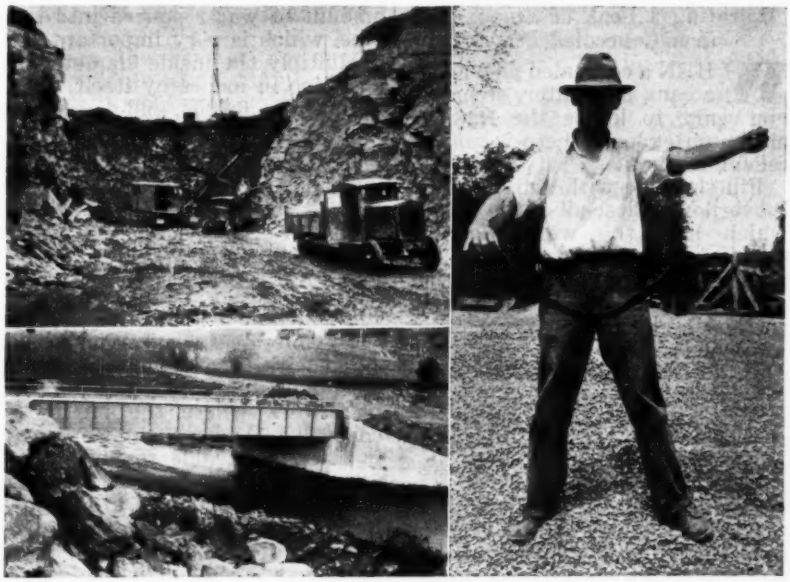
Collegiate: "I beg your pardon, Miss, but would you care to take a ride?"

Co-ed: "Sir! I'll have you know I'm a lady."

Collegiate: "I know that. If I wanted a man, I'd go home and get my father."

ROCKS 'N RATTLESNAKES

By SPENCER A. JONES



Right—A. M. Pederson, one of the New York State Highway Department engineers in charge of the construction of County Highway No. 1927, Sullivan County, with a rattler he killed. The snake is 4 feet 5 inches long and has 12 rattles and a button. In case you visit the job, the State Highway Department furnishes serum, and it is kept in the dynamite storehouse. Above—Looking into the heading of one of the deep cuts for County Highway No. 1927, Sullivan County. Sanderson Cyclone six inch drill on top of cliff. Linn tractors hauling rock away from Koehring No. 502, 1¼-yard gasoline shovel operated by Harry Shackleton. Below—Plate girder skew bridge over 10 mile river on Highway No. 1927. Old steel truss, bridge, with rubble, dry-masonry abutments, in background at left.

ROCKS AND RATTLESNAKES are outstanding features of a 10.39 mile stretch of highway construction work which Owen P. Williams Construction Company, Inc., Oneonta, New York, recently completed in Sullivan County, New York, between Minnisink and Narrowsburg. Roughly paralleling the east bank of the Delaware river, the new highway of bituminous macadam opens a section of the state which has hitherto been almost inaccessible. The contract called for the excavation of more than 666,000 cubic yards of unclassified material at a unit price of 37c.

After a little more than eight months' work, the score stood at the end of last season, at approximately 400,000 cubic yards of excavation, one plate girder skew bridge, 3,500 feet of 24" cast iron pipe culvert, 48 rattlesnakes and 12 copperheads. Charles T. Fisher, engineer in charge for the contractor, thought that was enough for one year, so he shut up shop for the winter. The balance of the work including a new crop of snakes was cleaned up early this year. W. H. Gobel and A. M. Pederson were engineers in charge for the N. Y. State Highway Department, reporting to J. W. Holler, district engineer, and A. T. Paine, supervising engineer.

Talk About Smooth!

TWO ROBINS selected the boom of a Bucyrus-Erie 1025 used in unloading sand and gravel at the Schwartz Material Company yard in St. Louis as a place to build their nest. The working of the clamshell at first dislodged the straw and twigs which the birds deposited in a corner of the lattice work about half way up the 75-foot boom. But robins are experienced builders and a little mud did the trick. Using it to cement the other materials into place the robins soon had a snug nest in which the female sits calmly on several robin-blue eggs, seemingly enjoying the constant change of scenery due to the swinging back and forth.

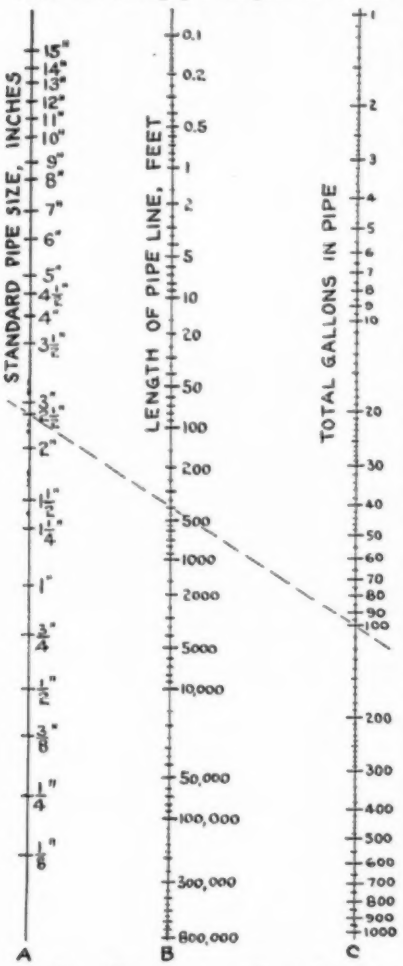
COURTESY ST. LOUIS POST-DISPATCH

FIELD NOTES

Locating a Leak or Stoppage in a Concealed Pipe

WHEN a concealed pipe leaks steam, air, water, etc., and you want to locate the leak at minimum expense, here is an excellent method:

Fill the pipe with water—until it overflows. Close all of the valves which hold the water against gravity. Then do nothing for a number of hours, possibly over night, depending upon the size of the leak and the rate at which the level in the pipe drops. In other words, allow as much water to leak out as *can* leak out.



Then, next morning, or at a suitable interval, using a calibrated can, fill the can with water and pour it rapidly into the pipe. One can full may not be enough. Two cans full may not be enough. Pour until the pipe is filled flush with the top, without allowing any overflow. Make note of the exact amount of water poured into the pipe, which is very important.

Multiply the inside diameter of any pipe in inches by itself, then multiply by 0.7854, and divide the result into the number of cubic inches of water poured into the pipe. The quotient is the distance to the "trouble spot" in inches. One can easily determine the number of cubic inches of water poured into a pipe from the fact that one U. S. gallon contains 231 cubic inches.

By this means leaks can be located with amazing accuracy resulting in minimum cost for repair work where the piping is concealed. And the same method is often applicable to pipes that are stopped up. You can readily calculate the "point of stoppage."

To assist in determining the number of gallons in any pipe, here is a handy chart. It takes care of all of the standard pipe sizes from ⅛ inch to 15 inches in column A, and any length of pipe from 0.1 foot to 800,000 feet in column B. Column C shows volumes from 1 to 1,000 gallons.

To use the chart simply run a straight line through the pipe size (column A) and the gallons of water poured into the pipe, (column C), and the intersection in (column B) immediately gives the location of the trouble spot.

For example, the dotted line drawn across this chart shows that if the pipe size is 2½ inches (column A), and if 100 gallons of water are poured into the pipe (column C), the trouble spot is 400 feet away (column B).

Inversely if it is desired to know the number of gallons in any length of pipe line, or the size of the pipe necessary to hold a given number of gallons within certain limitations of length, the chart may be conveniently applied. In other words knowing two factors in any two of the three columns, the unknown in the third column is quickly found.

—W. F. Schaphorst, M.E.

Pitfalls Must Be Safeguarded

LOSS of a youth's life, an $8,000 award of damages to the parents, and presumably heavy costs of litigation, were the consequences of a contractor's failure to safeguard bathers against falling into a tide covered trench excavated on the shore of Lake Pontchartrain near New Orleans.

The trench was 200 feet long, 25 feet wide and five to seven feet deep. It was excavated by a subcontractor in connection with the building of a sea wall.

A boy wading along the shore fell into the concealed trench and was drowned. Had the tide been out, the trench would have been visible. Deciding that the general contractor and the subcontractor were jointly liable, the Louisiana Court of Appeal said (Dinet v. Orleans Dredging Co., 149 So. 126):

"We experience little difficulty in arriving at the conclusion that those who dug the pit were guilty of negligence in digging it adjacent to a public bathing beach and leaving it remain in both an unguarded and unprotected condition, and without giving the bathers any warning whatsoever of the presence of this hazard, particularly when the workmen and the officers of both defendant companies knew that bathers and waders used the beach on both sides of the pier."

—Arthur L. H. Street, Attorney-at-Law.

Marking Stake Substitute

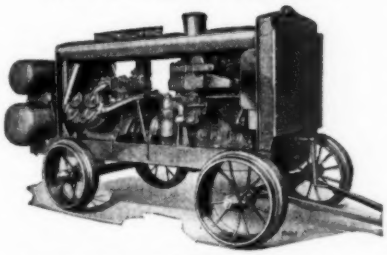
IT IS QUITE frequently practical if not absolutely necessary to mark some particular spot or location for future reference, even proof of some circumstance. A stick or rod driven into the ground is the usual method of course, but many times such tools of the surveyor's art are not at hand. Take an empty tobacco can, rip off the cover and crush the mouth closely together, forming a sharp wedge. Force this down into the ground. The bright bottom of the can makes it easy to locate later. A stick or stake is liable to be carelessly or accidentally pulled up or broken off. This can be walked over without disturbing it, and is readily covered if one wishes to conceal it. Makes a reliable and ready makeshift marker.

—Frank W. Bentley, Jr.

EQUIPMENT

You Ought to Know About

New Portable Compressor



A NEW PORTABLE air compressor has been developed by *Ingersoll-Rand Company, 11 Broadway, New York,* adapting the recognized advantage of two-stage stationary compressor and making it usable in portable units for the first time.

The compressor is a two-stage, air-cooled unit. It has two low-pressure cylinders, arranged in a V, and between them in vertical position, a high-pressure cylinder. Adoption of air cooling eliminates the danger of freezing and keeps the size and weight of the assembly within reasonable limits. Air cooling also insures cooler valves and cylinder walls, a long life and a low rate of decline in efficiency, simplification of lubrication problems and elimination of carbon. A Waukesha four-cylinder gasoline engine of the heavy-duty type, designed expressly for this service, supplies the power. Catalog 3064, which describes the new compressor, which is made in four sizes of 125, 185, 250, and 370 cubic feet per minute displacement, may be had at any office of Ingersoll-Rand Company.

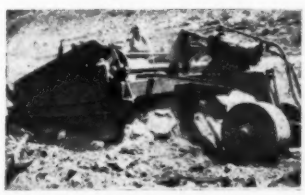
New Drop-Forged Wagon Track

A 15-TON drop-forged steel wagon track that is built and designed exactly like the track assembly of their Model "L" tractor was recently announced by *Allis-Chalmers Manufacturing Company, Milwaukee.* The essential principals of this new long life wagon track are: the load-carrying track-wheels roll on the rail of an endless track while the idlers, or end wheels, (non-weight carrying) pick up the track in the rear and deposit it at the front insuring a continual smoothness of action for the entire unit.

The side bars are drop-forged and heat-treated. Track pins and bushings are of carburized and hardened steel. The shoes are special rolled section, flat type, reinforced to distribute strength uniformly. Track, and end wheels are mounted on anti-friction bearings.

The net loading capacity is 15 to 20 tons. Overall dimensions of 80″ long, 36″ high, 19½″ wide and the track shoes are 18″ wide. These tracks weigh 5252 pounds per pair. The diameter of the axle bushings can be changed to fit any track wagon axle.

Scraper Wagon



THE NEW Gove scraper wagon with capacities of from 5 to 10 cubic yards offers an innovation in dirt movers of the pickup and carry type, with its newly developed folding bottom, according to the manufacturer. It is claimed that this unit is the first of its kind developed wherein the load is picked up, carried, dumped and spread by means of a collapsible bottom which folds up and into the load, permitting easy and quick disposal while tractor is under way or standing stationary.

For complete information and data, write to *E. T. Gove, 6449 Colby Street, Oakland, California,* mentioning this magazine, please.

New Wire Rope Socket

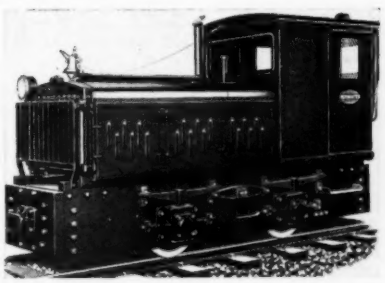
A RECENT development of the American Steel and Wire Company is the Fiege Tiger-Claw Wire Rope Socket. According to the manufacturer these sockets are composed of three simple parts, socket, sleeve and plug and eliminate all of the cumbersome, dangerous and difficult operations in connection with wire rope socketing. No flame nor hot metal is

required. They may be attached quickly and with ordinary unskilled labor. For further details write the *American Steel and Wire Company,* Room 1404 - 208 So. LaSalle Street, Chicago, Illinois.

Plymouth 10-ton Diesel Locomotive

A NEW 10-ton Diesel powered locomotive has been announced recently by *The Fate-Root-Heath Company, Plymouth, Ohio.* The power plant has 6 cylinders, solid injection type, developing 95 H. P. at 1200 R.P.M. Mechanical gear drive is provided in sizes from 6 to 60 tons; diesel-electric drive in sizes from 25 to 60 tons. The patented Plymouth 4-speed transmission incorporated into these latest locomotive developments makes it possible to apply the same power and speed in either forward or reverse movement.

Several decided improvements have been included in the Plymouth chassis. Side and end



frames are made from extra heavy steel to insure perfect alignment. Semi-elliptic springs are both side and cross equalized, insuring easy riding over rough and uneven track, practically eliminating any possibility of derailment. Cabs and canopies are made from heavy gauge sheet steel and are fully enclosed. For further information, please write the manufacturer, mentioning *Excavating Engineer.*

Caterpillar Power-Controlled Grader

THE NO. 66 "Caterpillar" grader with full power control was recently announced by

(Continued on page 432)

SHOTS from the Firing Line

Six Million Dollar Rio Grande Project to Start Soon

By HAMPTON SIDNEY SMITH, JR.

ACTUAL construction on the $6,106,500 Rio Grande rectification project will start before Christmas, according to L. M. Lawson, international boundary commissioner and W. E. Robertson, chairman of the rectification committee of the El Paso Chamber of Commerce. Work on the huge flood control project was assured when the Mexican senate on Sept. 13 ratified the treaty with the United States. The treaty provides for a straightened river channel from El Paso to Quitman canyon, and the construction of a storage dam at Caballo, N. M. Exchange of ratification will take place in Washington, probably within the next three weeks.

Out of the total amount appropriated for the work, Mexico is to pay 12 per cent and the United States, 88 per cent. That apportionment is based on the value of the property to be benefitted by the rectification. Five years will be needed to complete the project, and it is estimated that 1,000 men will be given work for this period.

The construction of Caballo dam, which is 22 miles below Elephant Butte dam, will be the first work to be undertaken. A contract will be let for the construction of the dam as soon as the appropriation is made. The contractor will operate under labor provisions of the public works administration, with maximum hours and minimum wages, and will be required to utilize man power whenever possible.

Contracts to bid on a 100,000,000 yards of Mississippi Valley Levees before Spring

THE U. S. ENGINEERS Offices in the Mississippi Valley are expecting to place under contract this fall and winter approximately 100,000,000 cubic yards of earth work.

The Memphis Engineers are preparing specifications for some 20,000,000 cubic yards in Missouri, Illinois, Ar-

Where the Money Went!

Bureau of Roads report of disbursements by state highway departments in 1932

STATE	1932 FISCAL YEAR ENDS 1/	GRAND TOTAL DISBURSEMENTS BY AND FOR STATE HIGHWAY DEPARTMENTS	EXPENDITURES FOR STATE HIGHWAY PURPOSES						OTHER DISBURSEMENTS BY STATE HIGHWAY DEPARTMENTS 5/			UNEXPENDED BALANCE AT THE END OF FISCAL YEAR	STATE
			TOTAL EXPENDITURES	CAPITAL INVESTMENT IN ROAD CONSTRUCTION AND 2/ RIGHT-OF-WAY	CURRENT HIGHWAY EXPENSES: MAINTENANCE 3/	CURRENT HIGHWAY EXPENSES: EQUIPMENT AND MACHINERY 3/	CURRENT HIGHWAY EXPENSES: MISCELLANEOUS EXPENSES	CURRENT HIGHWAY EXPENSES: INTEREST ON BONDS AND NOTES OUTSTANDING 4/	PRINCIPAL PAYMENTS ON BONDS AND NOTES 6/	TRANSFERS TO COUNTIES OR TOWNSHIPS FOR LOCAL ROADS 7/	OTHER OBLIGATIONS IMPOSED BY STATUTES 8/		
ALABAMA 9/	9/30	$ 7.195.228	$ 5.805.796	$ 1.573.768	$ 1.752.993	$ 267.999	$ 57.224	$ 2.153.810	$ 1.288.000	-	$ 101.454	$ 218.437	ALABAMA
ARIZONA	6/30	7.041.040	6.832.317	5.302.425	1.300.204	229.688	-	-	-	-	208.723	60.953	ARIZONA
ARKANSAS	2/28/33	8.167.625	7.242.663	604.619	834.550	76.198	-	10/ 5.727.296	618.607	$ 10.000	11/ 296.355	- 2.219.856	ARKANSAS
CALIFORNIA	6/30	40.001.037	38.228.037	27.981.676	7.161.892	426.257	-	12/ 2.656.212	12/ 1.775.001	-	-	9.716.572	CALIFORNIA
COLORADO	12/31	6.795.296	6.572.296	4.604.686	1.559.617	262.676	-	13/ 295.318	14/ 284.000	-	-	1.395.985	COLORADO
CONNECTICUT	6/30	15.445.444	14.156.076	10.226.191	3.499.969	262.239	167.677	-	-	-	15/ 1.289.368	3.510.748	CONNECTICUT
DELAWARE	6/30	3.385.862	3.155.785	2.378.102	253.544	45.399	-	478.780	72.685	-	16/ 157.472	1.028.754	DELAWARE
FLORIDA	12/31	7.530.190	6.589.034	4.631.082	2.172.949	61.003	-	-	-	-	17/ 665.346	633.409	FLORIDA
GEORGIA	6/30	20.756.285	20.091.599	17.426.109	2.331.568	317.862	-	-	-	-	17/ 704.736	1.731.178	GEORGIA
IDAHO	12/31	6.590.588	5.866.308	3.990.993	1.487.902	256.364	-	18/ 131.049	19/ 454.600	-	-	271.480	IDAHO
ILLINOIS	12/31	45.091.566	38.215.540	27.495.523	4.186.871	689.833	34.700	5.882.613	2.500.000	3.484.779	15/ 911.247	13.815.138	ILLINOIS
INDIANA	9/30	23.182.662	21.182.662	15.973.267	4.223.625	985.770	-	-	-	-	20/ 2.000.000	6.595.143	INDIANA
IOWA	11/30	25.738.048	21.920.548	14.530.778	2.614.582	442.951	-	21/ 4.332.237	21/ 1.817.500	-	-	3.083.602	IOWA
KANSAS	12/31	19.703.877	12.550.284	8.106.580	2.878.004	1.566.600	-	-	-	-	153.673	2.761.686	KANSAS
KENTUCKY	11/30/33	19.137.596	13.161.346	4.162.551	1.042.106	-	28.703	412.039	636.000	-	400.579	717.775	KENTUCKY
LOUISIANA	12/31	38.852.010	26.943.408	20.171.724	3.685.128	65.624	-	22/ 3.020.932	23/ 4.093.375	-	24/ 7.815.227	2.884.859	LOUISIANA
MAINE	12/31	16.242.631	11.189.139	7.252.711	1.946.239	484.695	539.326	935.168	877.000	1.265.933	2.930.565	751.463	MAINE
MARYLAND	9/30	15.949.528	14.083.273	10.647.614	2.234.806	369.263	-	12/ 835.590	12/ 1.692.000	-	174.255	2.274.749	MARYLAND
MASSACHUSETTS	11/30	29.596.149	18.696.013	11.730.692	6.487.029	174.575	47.353	256.364	239.133	3.280.634	25/ 7.380.369	6.383.852	MASSACHUSETTS
MICHIGAN	6/30	36.210.694	34.078.692	29.505.273	6.324.781	-	-	2.248.638	1.833.402	52.760	240.800	4.877.202	MICHIGAN
MINNESOTA	12/31	36.579.068	33.130.334	28.185.156	3.668.114	531.204	-	21/ 1.731.860	1.958.799	1.739.873	430.000	3.388.595	MINNESOTA
MISSISSIPPI	1/31/33	4.759.201	4.748.768	2.510.931	1.973.884	263.953	-	-	-	-	10.433	196.947	MISSISSIPPI
MISSOURI	12/31	37.335.093	35.137.093	26.051.294	3.563.377	1.603.395	-	3.919.027	1.000.000	-	1.198.000	8.113.818	MISSOURI
MONTANA	6/30	8.502.275	8.489.137	6.663.483	1.350.335	409.185	-	56.134	-	-	13.138	38.814	MONTANA
NEBRASKA	12/31	10.057.157	9.940.926	6.803.753	3.034.548	102.625	-	-	-	-	116.231	519.477	NEBRASKA
NEVADA	6/30	4.398.840	4.152.467	3.443.578	686.156	16.905	-	25.828	130.500	-	15.473	- 225.688	NEVADA
NEW HAMPSHIRE	1/31/33	7.111.569	6.317.941	3.168.549	2.687.907	250.235	-	210.850	575.000	169.312	49.716	762.878	NEW HAMPSHIRE
NEW JERSEY	12/31	49.196.970	36.892.630	25.447.003	2.235.981	72.836	1.500.335	12/ 7.636.475	12/ 2.237.187	6.650.536	26/ 3.416.617	21.820.317	NEW JERSEY
NEW MEXICO	12/31	5.718.041	4.937.561	2.478.744	1.795.378	140.883	76.536	446.000	780.500	-	-	522.918	NEW MEXICO
NEW YORK	12/31	54.285.002	53.685.002	36.698.790	9.714.295	1.624.031	427.886	5.220.000	600.000	-	-	57.066.033	NEW YORK
NORTH CAROLINA	6/30	22.516.232	11.098.406	2.727.728	3.610.626	27/ -	-	4.760.052	3.200.000	7.704.265	513.561	3.356.072	NORTH CAROLINA
NORTH DAKOTA	12/31	5.084.336	4.268.642	3.038.825	1.134.458	95.359	-	-	-	815.594	-	176.742	NORTH DAKOTA
OHIO	12/31	36.703.177	35.662.401	22.772.660	13.386.431	491.310	-	-	-	-	1.040.776	2.846.118	OHIO
OKLAHOMA	12/31	12.144.149	12.136.765	9.150.862	2.414.079	571.824	-	-	-	-	7.404	1.615.470	OKLAHOMA
OREGON	12/31	13.188.396	10.014.268	6.905.577	2.123.998	28/ -	14.648	1.370.445	29/ 2.375.000	-	199.088	1.291.855	OREGON
PENNSYLVANIA	12/31	68.947.268	56.062.556	31.417.296	15.203.805	5.046.872	694.896	3.739.687	3.000.000	344.587	30/ 9.540.125	17.626.867	PENNSYLVANIA
RHODE ISLAND	6/30	4.767.726	4.070.393	2.875.177	934.093	18.003	-	243.080	75.815	56.191	31/ 566.325	765.837	RHODE ISLAND
SOUTH CAROLINA	12/31	15.328.413	5.628.116	3.158.069	1.213.617	19.840	136.594	32/ 1.100.000	12/ 5.000.000	33/ 4.323.139	377.158	3.432.499	SOUTH CAROLINA
SOUTH DAKOTA	12/31	5.413.414	4.832.936	3.338.111	1.469.632	10.312	14.881	-	-	474.234	106.264	227.691	SOUTH DAKOTA
TENNESSEE	6/30	25.405.212	14.076.257	6.278.782	1.940.811	1.071.284	438.201	34/ 4.347.159	35/ 9.480.703	-	36/ 1.848.272	8.308.574	TENNESSEE
TEXAS	8/31	42.795.910	39.177.048	28.100.167	10.539.907	410.499	126.475	-	-	-	3.618.862	11.068.434	TEXAS
UTAH	12/31	6.037.495	5.569.925	3.414.157	1.558.587	242.752	29.429	12/ 325.000	12/ 412.500	-	55.070	276.380	UTAH
VERMONT	6/30	6.176.866	5.303.858	3.243.271	1.307.685	467.902	-	12/ 285.000	12/ 400.000	-	473.008	947.040	VERMONT
VIRGINIA	6/30	17.639.789	16.144.931	9.137.500	6.630.977	-	121.253	255.201	1.000.000	-	496.828	2.847.131	VIRGINIA
WASHINGTON	3/31/33	19.494.062	15.524.191	12.197.508	3.228.649	98.034	-	-	-	3.509.871	-	-	WASHINGTON
WEST VIRGINIA	12/31	20.070.222	16.354.767	8.984.228	5.016.591	254.280	-	4.099.668	3.557.500	-	157.955	3.177.519	WEST VIRGINIA
WISCONSIN	6/30	25.704.736	25.678.515	20.241.742	5.426.284	10.489	-	-	-	-	26.221	6.799.213	WISCONSIN
WYOMING	12/31	5.151.155	4.967.392	3.405.524	910.770	67.773	-	183.325	175.000	-	8.763	136.168	WYOMING
TOTAL		955.486.370	816.706.481	551.445.899	169.479.399	22.131.907	4.416.117	69.232.199	54.379.766	34.324.788	49.976.335	218.130.103	TOTAL

NOTES:
1/ FISCAL YEARS END IN 1932, EXCEPT THOSE DATED JANUARY, FEBRUARY, OR MARCH, WHICH END IN 1933.
2/ INCLUDES PRO RATA SHARE OF COST OF ADMINISTRATION, ENGINEERING, MATERIALS, AND SUPPLIES.
3/ COVERS PURCHASE (A CAPITAL INVESTMENT), RENTAL, AND REPAIRS; ABOUT 85 PERCENT OF THESE EXPENDITURES WERE APPLICABLE TO MAINTENANCE.
4/ PAYMENTS FROM STATE HIGHWAY DEPARTMENT FUNDS UNLESS NOTED.
5/ INCLUDES OBLIGATORY DISBURSEMENTS NOT DIRECTLY RELATED TO STATE HIGHWAY EXPENDITURES.
6/ PAYMENTS UNLESS NOTED ARE FROM STATE HIGHWAY DEPARTMENT FUNDS AND REPRESENT RETIREMENT OF INDEBTEDNESS AND DEPOSITS IN SINKING FUNDS. THESE BORROWED FUNDS HAVING BEEN REPORTED AS EXPENDITURES IN PREVIOUS YEARS, CAN NOT PROPERLY BE CONSIDERED AGAIN AS EXPENDITURES FOR HIGHWAYS.
7/ AMOUNTS SHOWN ARE RECEIVED AND MERGED AS INCOME BY LOCAL ROAD AUTHORITIES.
8/ AMOUNTS SHOWN ARE FOR PURPOSES OTHER THAN RURAL HIGHWAY CONSTRUCTION AND MAINTENANCE SUCH AS POLICE PATROL; ADMINISTRATION AND COLLECTION OF MOTOR VEHICLE LICENSE AND OTHER FEES. GASOLINE TAX COLLECTIONS (AND REFUNDS); CONSTRUCTION OF CITY STREETS AS PART OF STATE HIGHWAYS; ETC.
9/ INCLUDES EXPENDITURES OF STATE BRIDGE CORPORATION.
10/ INCLUDES $4,254,980 INTEREST ON NOTES.
11/ INCLUDES $133,722 FOR AUDIT COMMISSION AND $151,200 TRANSFERRED TO STATE GENERAL FUND.
12/ PAYMENTS FROM STATE GENERAL FUND.
13/ INCLUDES $191,310 FROM STATE ROAD TAXES.
14/ INCLUDES MOTOR VEHICLE DEPARTMENT EXPENSES AND REFUNDS, $1,119,474.
15/ FOR STATE PATROL.
16/ INCLUDES $612,040 TRANSFERRED TO STATE GENERAL FUND.
17/ INCLUDES $540,000 FOR PURCHASE OF WESTERN AND ATLANTIC RAILROAD RENTAL WARRANTS.
18/ INCLUDES $51,751 INTEREST ON NOTES.
19/ INCLUDES $277,000 NOTES RETIRED.
20/ TRANSFER TO STATE BOARD OF FINANCE.
21/ PAYMENTS ON STATE-ASSUMED COUNTY BONDS.
22/ INCLUDES $229,957 ON NOTES.
23/ INCLUDES $3,179,575 NOTES.
24/ INCLUDES $7,000,000, FROM PROCEEDS OF BOND SALES, TRANSFERRED TO THE STATE ADVISORY BOARD FOR CONSTRUCTION OF A BRIDGE OVER THE MISSISSIPPI RIVER AT NEW ORLEANS.
25/ INCLUDES $5,500,000 TO CITIES AND TOWNS FROM EXTRA ONE CENT GASOLINE TAX FOR ALLEVIATION OF UNEMPLOYMENT.
26/ INCLUDES $2,016,505 TO PORT AUTHORITY OF NEW YORK AND $1,319,113 TO DELAWARE RIVER COMMISSION.
27/ INCLUDED IN CONSTRUCTION AND MAINTENANCE.
28/ EXPENSES EXCEEDED BY RENTAL INCOME.
29/ INCLUDES $1,000,000 NOTES.
30/ INCLUDES $5,833,333 REPAYMENT OF LOAN FROM STATE TREASURY.
31/ INCLUDES $266,859 FOR UNEMPLOYMENT RELIEF FROM GASOLINE TAX.
32/ INCLUDES $175,000 ON NOTES.
33/ CONSISTS LARGELY OF COUNTY BOND RETIREMENTS.
34/ INCLUDES $2,269,833 ON NOTES.
35/ INCLUDES $9,000,000 NOTES.
36/ INCLUDES $1,715,982 TRANSFERRED TO STATE GENERAL FUND.

kansas, Kentucky, Tennessee and Mississippi and hope to be ready to obtain bids on these projects about October 5th. Practically all of this work is on loops where operations may be continued through the fall and into the winter. In addition there is a 600,000 cubic yard levee job at Mounds, Illinois and the Hickman, Kentucky seawall and levee job on which the dirt moving will amount to 186,000 cubic yards. In addition to this and the 14,344,000 cubic yards in the letting September 16th, there are plans for bringing about 40,000,000 additional yards next spring.

Vicksburg has only a small amount of yardage yet to be placed, all of which will be under contract this fall. 6,000,000 yards of Louisiana and Mississippi work was in the September 20th letting.

New Orleans is reported expecting to have some 25,000,000 cubic yards of earth work under contract as of September 30th. No announcement has been made as to the yardage contemplated beyond that date but it is known that this is only the beginning of the program on the lower Mississippi and the Atchafalaya.

Nature is a wonderful thing! A million years ago she didn't know we were going to wear spectacles, yet look at the way she placed our ears.

Columbia Basin Power Project Involves 9,500,000 Cubic Yards of Excavation

TO BE CONSTRUCTED on the Columbia River about 22 miles north of Almira and 75 miles west of Spokane, the Grand Coulee dam and power plant of the Columbia basin project is now being planned by the Bureau of Reclamation. The dam will be built to a height of 251 feet and the accompanying power plant will have eight generating units with an installed capacity of 700,000 horsepower. The dam will create a lake in the river about 50 miles long extending to a point about opposite Fruitland. The preliminary design of the dam calls for a multiple type arch structure across the river section up the right abutment approximately 2,300 feet long and a mass concrete gravity section on the left side of the river and left abutment 1,100 feet long with a total length of 3,430 feet. An uncontrolled ogee crest spillway 1,950 feet long occupies the left section of the multiple arch portion of the dam and has a discharge capacity of 1,000,000 second-feet. A power plant will be constructed a sufficient distance down stream from the gravity section of the dam to permit later raising of the dam without interfering with the power plant. Here eight generating units of 65,000 kilowatt capacity each will provide 520,000 kilowatts or 700,000 horsepower. The maximum head will be 135 feet. The annual production of electrical energy is estimated at 2,200,000,000 kilowatt hours of firm energy and 500,000,000 kilowatt hours of secondary energy to be sold at 2.25 mills and ½ mill per KWH respectively.

Among the principal items of work and materials required for this $63,000,000 project are: common excavation for dam and power house 9,000,000 cubic yards; rock excavation, 450,000 cubic yards; concrete, 1,777,000 cubic yards; reinforcing bars 22,100,000 pounds; standard steel and cast-iron pipe and fittings, 686,000 pounds; high pressure, hydraulically-operated sluicegate trash-rack metal work, 1,115,000 pounds; structural steel and other metal work, 1,067,000 pounds, a $600,000 railway to the dam site, a $50,000 camp and a $300,000 fish ladder.

The U. S. Bureau of Reclamation has established a field office for this project at Almira, Washington about 22 miles from the dam site, where F. A. Banks, construction engineer is in charge. It is expected that preliminary work will require about six months and that construction work can be started in the spring of 1934.

Where the Money Came From!

Bureau of Roads report of sources of funds available for state highway and bridge work in 1932

STATE	1932 FISCAL YEAR ENDS 1/	TOTAL FUNDS AVAILABLE	BALANCE FROM PREVIOUS FISCAL YEAR 2/	TOTAL INCOME INCLUDING LOANS 3/	CURRENT REVENUE FROM STATE SOURCES: TOTAL STATE HIGHWAY REVENUE	STATE ROAD TAX LEVY 4/	APPROPRIATIONS FROM GENERAL FUNDS 4/	MOTOR VEHICLE FEES, ETC., ALLOTTED TO STATE HIGHWAYS 5/	GASOLINE TAX RECEIPTS, ETC., ALLOTTED TO STATE HIGHWAYS 5/	MISCELLANEOUS REVENUE	CONTRIBUTIONS FROM OTHER THAN STATE SOURCES: FROM FEDERAL SOURCES: FEDERAL AID FUNDS 6/	EMERGENCY FUNDS 7/	TRANSFERS FROM LOCAL SOURCES FOR STATE HIGHWAYS 8/	LOANS, PROCEEDS FROM SALES OF BONDS AND NOTES 9/	STATE
ALABAMA 10/	9/30	$ 7,413,666	$ - 857,173	$ 8,260,838	$ 7,163,940	-	-	$ 2,459,317	$ 4,360,431	10/ $ 353,191	11/ $ 768,081	$ 320,835	$ 8,000	-	ALABAMA
ARIZONA	6/30	7,101,993	534,260	6,567,733	5,211,145	11/ $ 24,729	$ 99,800	668,717	2,282,892	135,596	2,820,900	726,465	1,600	-	ARIZONA
ARKANSAS	2/29/33	6,047,789	- 625,545	6,673,314	6,270,020	-	-	1,666,273	4,502,216	101,534	314,612	66,522	22,140	-	ARKANSAS
CALIFORNIA	6/30	49,719,609	12,402,162	37,317,447	29,938,354	-	12/ 4,961,212	3,851,940	20,914,002	13/ 700,000	4,864,357	2,941,410	173,426	-	CALIFORNIA
COLORADO	12/31	3,252,218	750,788	2,501,429	2,195,706	14/ 418,633	-	307,358	1,780,441	37,182	1,834,211	-	104,879	-	COLORADO
CONNECTICUT	6/30	18,956,192	3,402,385	15,553,807	13,959,690	-	-	8,113,536	4,800,046	646,098	1,126,046	443,414	484,694	-	CONNECTICUT
DELAWARE	6/30	4,414,636	393,429	4,021,207	2,133,372	-	-	1,080,907	1,100,432	12,033	822,643	-	-	$ 1,005,202	DELAWARE
FLORIDA	12/31	8,063,739	906,038	7,157,701	6,931,227	-	-	228	6,780,230	150,769	226,116	18,483	261,935	-	FLORIDA
GEORGIA	6/30	27,486,305	3,986,305	23,500,000	20,599,526	-	-	3,774,539	8,701,586	97,341	4,285,390	990,522	800,018	-	GEORGIA
IDAHO	12/31	6,697,530	482,905	6,214,625	4,308,431	12/ 256,897	-	190,489	2,943,628	16/ 1,317,441	1,298,508	175,840	431,895	-	IDAHO
ILLINOIS	12/31	58,906,734	16,319,408	42,587,296	35,521,144	-	27,802	16,812,997	18,680,578	667	4,888,086	-	194,566	1,983,500	ILLINOIS
INDIANA	9/30	29,777,805	6,492,710	23,347,105	19,318,297	-	-	5,635,321	12,713,140	969,836	4,008,808	-	-	-	INDIANA
IOWA	12/31	26,021,950	5,824,148	20,597,502	16,496,286	-	-	15,996,186	5,496,323	3,423	2,136,782	352,787	-	17/ 1,618,067	IOWA
KANSAS	12/31	15,485,761	3,133,940	12,332,221	9,238,513	-	-	3,666,799	5,563,093	9,661	2,405,350	246,421	441,937	-	KANSAS
KENTUCKY	3/31/33	20,991,699	4,802,385	16,091,313	13,758,807	684,296	-	3,415,520	8,111,860	18/ 1,546,931	1,561,097	612,532	178,914	-	KENTUCKY
LOUISIANA	12/31	41,736,869	2,971,998	38,764,871	11,660,901	-	-	5,052,548	7,351,409	256,944	13/ 1,423,757	368,225	52,753	20/ 25,459,235	LOUISIANA
MAINE	12/31	10,994,100	3,180,398	13,813,702	6,992,173	757,290	580,416	1,952,771	2,342,294	859,462	1,486,547	77,832	1,618,395	4,544,795	MAINE
MARYLAND	9/30	18,224,277	2,480,118	15,744,159	12,442,109	-	12/ 2,527,590	2,373,039	6,972,376	569,104	500,963	6,139	1,748,475	1,946,473	MARYLAND
MASSACHUSETTS	11/30	10,287,900	10,287,900	25,892,051	25,231,943	-	-	6,561,646	16,951,868	11,429	2,200,875	-	250,833	-	MASSACHUSETTS
MICHIGAN	6/30	41,087,923	5,830,515	35,257,408	27,852,950	-	-	11,732,130	15,328,756	732,064	4,223,327	2,352,101	829,030	-	MICHIGAN
MINNESOTA	12/31	40,847,607	7,299,950	33,547,657	19,145,302	1,661,171	-	10,103,332	6,745,706	694,993	3,099,532	1,417,823	-	10,015,800	MINNESOTA
MISSISSIPPI	1/31/33	662,410	4,956,148	5,293,758	5,211,145	-	-	161,112	5,015,452	579,621	119,707	-	323,296	-	MISSISSIPPI
MISSOURI	12/31	46,448,911	5,508,385	39,540,526	19,751,216	-	-	9,919,544	9,398,206	433,466	2,255,816	159,248	67,713	17,706,533	MISSOURI
MONTANA	6/30	8,541,089	- 1,277	8,542,366	2,757,150	-	-	-	2,732,943	24,207	1,239,233	1,006,619	41,398	1,500,000	MONTANA
NEBRASKA	12/31	10,576,034	193,527	9,183,111	7,400,579	-	100,113	1,129,128	6,171,338	-	1,909,131	407,862	96,594	-	NEBRASKA
NEVADA	6/30	4,872,952	- 173,694	4,852,646	1,598,554	93,984	-	799,467	704,550	3,773	1,835,899	493,637	19,896	800,000	NEVADA
NEW HAMPSHIRE	1/31/33	7,874,447	1,388,946	6,487,501	4,804,856	-	-	1,917,486	2,996,276	891,094	476,391	119,120	87,132	1,000,000	NEW HAMPSHIRE
NEW JERSEY	12/31	71,217,087	21,065,192	49,952,095	31,748,943	22/ 6,513,048	-	9,214,618	8,990,874	23/ 7,029,803	3,121,047	149	-	15,081,936	NEW JERSEY
NEW MEXICO	12/31	2,840,997	229,080	2,611,917	2,579,520	80,312	-	1,427,227	1,216,001	-	1,498,102	257,825	193,334	1,000,000	NEW MEXICO
NEW YORK	12/31	111,351,039	66,576,156	45,772,479	30,081,302	24/ 7,622,893	13,002,133	9,415,337	40,539	10,830,324	571,420	1,150,933	3,137,000	NEW YORK
NORTH CAROLINA	6/30	25,872,304	1,577,997	24,294,307	20,600,113	-	-	5,552,211	14,941,181	126,721	2,401,535	1,272,699	-	-	NORTH CAROLINA
NORTH DAKOTA	12/31	7,561,018	447,186	7,113,832	6,813,792	-	35,077	924,215	1,230,000	6,102	1,481,414	329,562	520,662	-	NORTH DAKOTA
OHIO	12/31	30,596,295	8,941,270	30,608,025	24,272,586	-	-	4,822,731	19,358,568	890,707	5,086,931	851,108	-	-	OHIO
OKLAHOMA	12/31	13,759,633	2,885,646	10,873,596	9,878,451	-	-	2,305,489	7,547,903	25,059	496,262	-	499,281	-	OKLAHOMA
OREGON	12/31	14,480,211	2,178,975	12,302,136	9,568,697	-	-	3,442,839	5,991,823	134,039	1,558,514	144,895	228,751	1,001,349	OREGON
PENNSYLVANIA	12/31	86,074,139	24,098,301	62,982,551	56,592,270	-	-	28,016,313	25,144,517	25/ 2,631,440	1,401,132	130,029	1,602,410	-	PENNSYLVANIA
RHODE ISLAND	6/30	5,533,581	4,253	5,529,328	4,153,105	-	-	2,196,753	1,920,974	34,378	974,233	400,000	-	-	RHODE ISLAND
SOUTH CAROLINA	12/31	18,760,872	4,078,607	14,682,265	7,988,491	-	-	2,156,261	5,306,031	526,199	1,473,340	220,434	-	5,000,000	SOUTH CAROLINA
SOUTH DAKOTA	12/31	8,640,909	286,792	8,354,117	6,113,565	48,145	-	519,816	2,893,376	105,751	1,170,214	516,602	5,207	-	SOUTH DAKOTA
TENNESSEE	6/30	33,713,786	8,009,407	25,704,379	14,129,168	-	27/ 2,705,164	3,704,160	6,401,986	28/ 1,317,858	1,569,856	817,027	208,328	9,000,000	TENNESSEE
TEXAS	8/31	56,284,344	13,722,936	40,561,408	25,442,955	-	-	3,405,000	21,584,666	452,289	6,811,573	2,053,304	6,251,916	-	TEXAS
UTAH	12/31	6,313,475	343,123	5,970,352	4,129,857	-	-	796,812	2,939,000	393,995	1,301,380	130,994	408,581	-	UTAH
VERMONT	9/30	3,761,908	889,940	2,871,994	2,903,794	309,731	782,645	2,874,800	2,072,599	1,693	540,598	353,930	238,312	-	VERMONT
VIRGINIA	6/30	20,326,890	953,698	19,373,192	16,493,319	-	29/ 1,780,573	5,602,229	8,760,993	339,226	1,841,802	995,736	42,535	-	VIRGINIA
WASHINGTON	3/31/33	19,984,062	-	19,984,062	16,486,677	-	-	1,893,418	14,683,298	-	1,885,618	541,617	580,130	-	WASHINGTON
WEST VIRGINIA	12/31	23,282,741	7,504,558	15,743,183	12,969,784	-	-	4,976,185	4,978,749	1,101,138	773,670	93,429	-	5,250,000	WEST VIRGINIA
WISCONSIN	6/30	32,463,949	13,437,275	19,026,674	10,124,139	-	-	4,193,934	5,747,450	182,755	3,224,126	1,539,323	4,139,086	-	WISCONSIN
WYOMING	12/31	5,257,323	1,324,853	3,932,470	2,014,526	30/ 31,964	-	666,386	1,063,639	252,537	1,582,102	343,469	52,393	-	WYOMING
TOTAL		1,173,576,473	275,258,673	898,317,794	632,199,797	10,884,756	20,703,283	211,321,285	363,368,041	25,922,432	31/ 111,408,776	32/ 25,448,398	24,610,943	104,649,840	TOTAL

NOTES:
1/ FISCAL YEARS END IN 1932. EXCEPT THOSE DATED JANUARY, FEBRUARY, OR MARCH, WHICH END IN 1933
2/ SEVERAL BALANCES HAVE BEEN REVISED SINCE PREVIOUS YEAR AND ERRORS CORRECTED.
3/ IN COMBINING THIS INCOME WITH THE CORRESPONDING INCOME FOR LOCAL ROADS TO DERIVE THE TOTAL RURAL ROAD INCOME THERE SHOULD BE OMITTED BOTH THE FUNDS TRANSFERRED FROM STATE TO LOCAL AUTHORITIES AND VICE VERSA, AS SUCH FUNDS ARE ALSO REPORTED AS DIRECT INCOME IN THE RECEIPTS OF EACH OF THESE TWO GOVERNMENTAL UNITS.
4/ STATE TAX ASSESSMENTS AND APPROPRIATIONS FROM STATE GENERAL FUND ARE OFTEN MADE TO COVER BOND OBLIGATIONS, AND IF SO REPORTED ARE NOTED.
5/ THESE COLUMNS DIFFER FROM APPARENTLY SIMILAR COLUMNS IN TABLES MF-2 AND MF-3 BECAUSE OF DIFFERENCES IN FISCAL YEARS AND DELAY IN TRANSFER OF FUNDS; ALSO SPECIAL FEES ON MOTOR MOTOR BUSSES AND TRUCKS HERE INCLUDED WERE WITH MOTOR VEHICLE FEES WHICH HERE NOT A PART OF MOTOR VEHICLE RECEIPTS IN TABLE MF-2.
6/ INCLUDES, IN ADDITION TO REGULAR FEDERAL AID FUNDS, FUNDS FOR CONSTRUCTION OF ROADS DAMAGED BY FLOODS AS FOLLOWS: ALABAMA, $268,335; FLORIDA, $77,256; GEORGIA, $418,208; KENTUCKY $206,346; MISSOURI $119,428; SOUTH CAROLINA, $221,675.
7/ INCLUDES LOANS FROM THE $80,000,000 EMERGENCY ADVANCE FUND OF 1930 AND THE $120,000,000 EMERGENCY CONSTRUCTION FUND OF 1932.
8/ PROCEEDS FROM SHORT TERM NOTES ARE SPECIALLY NOTED.
9/ INCLUDES INCOME OF STATE BRIDGE CORPORATION.
10/ INCLUDES $268,576 FROM COLLECTION OF BRIDGE TOLLS.
11/ NET TAX RETURN AFTER PAYMENT OF TAX ANTICIPATION LOAN OF $650,000, ADVANCED BY STATE TREASURY IN 1931
12/ FOR PAYMENTS OF BOND INTEREST AND RETIREMENT.
13/ INCLUDES $650,000 ADVANCE LOAN FROM STATE TREASURY FOR SAN FRANCISCO – OAKLAND BAY BRIDGE.
14/ FOR PAYMENTS OF INTEREST AND TO SINKING FUND ON 1932 ISSUE OF BONDS.
15/ SUM REMAINING FOR STATE HIGHWAYS AFTER DIVERSION OF LARGE PART TO COUNTY SCHOOL FUND.
16/ INCLUDES $528,166 FROM RENTAL OF EQUIPMENT.
17/ STATE-ASSUMED COUNTY BONDS, ISSUED FOR STATE HIGHWAYS.
18/ INCLUDES BRIDGE TOLLS.
19/ INCLUDES SPECIAL FEDERAL FLOOD CONTROL ACT ALLOTMENT, $820,502.
20/ INCLUDES NOTES OF $2,385,573; AND $7,000,000 BONDS FOR BUILDING MISSISSIPPI RIVER BRIDGE BY STATE ADVISORY BOARD.
21/ INCLUDES OPERATIONS OF PORT AUTHORITY OF NEW YORK, AND DELAWARE RIVER JOINT COMMISSION.
22/ ASSESSMENT FOR BOND INTEREST.
23/ INCLUDES $5,327,351 FROM PORT AUTHORITY OF NEW YORK AND $1,545,785 FROM DELAWARE RIVER JOINT COMMISSION.
24/ INCLUDES $6,018,039 FROM STATE GENERAL FUND FOR BOND OBLIGATIONS
25/ INCLUDES $2,000,000 FEDERAL UNEMPLOYMENT RELIEF FUND.
26/ NOTES RENEWED.
27/ COVERS BOND INTEREST OF BRIDGE BONDS AND HIGHWAY NOTES.
28/ INCLUDES $417,294 BRIDGE TOLLS.
29/ INCLUDES $1,255,201 APPROPRIATED FROM SINKING FUND DERIVED FROM MOTOR VEHICLE FEES AND GASOLINE TAXES.
30/ ASSESSMENT FOR STATE HIGHWAY SINKING FUND FOR BOND INTEREST AND RETIREMENTS.
31/ INCLUDES $2,132,780 FOR CONSTRUCTION OF ROADS DAMAGED BY FLOODS.
32/ CONSISTS OF $16,869,725 FROM APPROPRIATION OF DECEMBER 20, 1930 AND $8,578,673 FROM APPROPRIATION OF JULY 21, 1932.

Shots From the Firing Line—*Continued*

$15,415,000 P.W.A. Released for Fourteen Irrigation Projects

APPROVAL of the expenditure of $15,415,000 from the public works funds on fourteen irrigation projects was recently announced by Public Works Administrator H. L. Ickes. This program brings no new lands under cultivation but will improve agricultural conditions on existing projects. The work will be done under the provisions of the Reclamation Law which provides that such projects must be self liquidating. The Bureau of Reclamation estimates that these projects will provide 2,055,000 man-days of work—that employment will be given to 3,960 men.

$120,000 is allotted to the Yuma project in Arizona for completion of the drainage system now 86 per cent constructed. $100,000 goes to the Boise project in Idaho for additional drainage to relieve saturated area. Allotted for the Upper Snake River in Idaho is $4,000,000 to be used for the construction of storage reservoirs which will eliminate the water shortages which in recent years have been so serious as to bring many of the Upper Snake River farmers to the verge of bankruptcy. Allotted to the Gooding Division of the Minidoka Project in Idaho is $400,000 for the improvement of a lateral system to serve lands of the Wood River Valley near Shoshone. $100,000 on the Bitter Root project in Montana will be used for reconstruction of a portion of the canal system to insure satisfactory water service to lands irrigated since 1910. $65,000 goes to the Milk River project in Montana for construction of small laterals and structures for delivery of water. $2,000,000 will provide for the construction of the Chain Lakes Dam and storage reservoir on the St. Mary's River near Havre, Montana to permit more water for irrigating of the lands of the Milk River project and the neighboring irrigation projects. $600,000 will be used to complete the Sun River Project also in Montana. $1,500,000 goes for the Newlands project in Nevada to provide additional storage through the construction of a reservoir on the Truckee River. $2,000,000 goes for the Humboldt project also in Nevada and will provide a storage reservoir on the lower Humboldt to permit increasing the water supply for ranchers on about 33,000 acres of alfalfa land. $500,000 goes into New Mexico and Texas to construct drains and laterals on the nearly completed Rio Grande project where $13,500,000 has already been spent and is being repaid by the water users. $930,000 is allotted for the Hyrum project in Utah and will provide a dam and reservoir on the Little Bear near the town of Wellsville, Utah and permit a more certain water supply for land in the Salt Lake basin. The Ogden River development gets $3,000,000 for construction of a dam and reservoir near Huntsville about 10 miles from the city of Ogden, Utah. This reservoir will provide a supplemental and a regular water supply to land now under irrigation, but badly in need of additional water. $100,000 goes to the Stanfield project in Oregon to provide for rehabilitation of the project and the rebuilding of flumes and other canal structures.

In addition to the above $15,415,000 allottment the Bureau of Reclamation has also $63,000,000 to spend on the Columbia basin project in Washington, $38,000,000 for continuance of work in Boulder Canyon, $22,700,000 to spend on the Casper-Alcova project in Wyoming and $6,460,000 for the Owyhee, Vale and Yakima projects.

100th Anniversary Alfred Nobel's Birth

THE NAME of Alfred Nobel, the one hundredth anniversary of whose birth occurs shortly (he was born at Stockholm, Sweden, October 21, 1833) is most frequently seen in print today in connection with the Nobel prizes which he established at his death in 1896, annual cash awards for outstanding achievement in physics, chemistry, physiology or medicine, imaginative literature and the furtherance of world peace.

Nobel first became news, however, in 1867 through an outstanding achievement of his own in the field of chemistry. By mixing nitroglycerin, which had been discovered by Sobrero in 1856, with kieselguhr, a kind of highly absorbent earth, he invented dynamite. At about the same time he also invented a copper capsule loaded with fulminate of mercury for exploding dynamite, and, within ten years, in spite of the many difficulties and dangers involved, he had firmly established the manufacture and use of dynamite in both Europe and the United States.

Dynamite has probably played a larger part in the material progress of the world during the past half century than any other single agent. The dynamite which is used today for these varied purposes of mining, quarrying, tunneling, road and dam building, drainage, land clearing, and channel deepening is of many different kinds, each especially adapted for the particular work for which it is intended. Indeed, the improvements and variations which chemists have made in dynamite since Nobel's death would amaze and delight him, but they all make use of his original invention of mixing nitroglycerin with an absorbent which would make it convenient and safe to transport, load in a bore hole and explode at the moment desired. To Alfred Nobel, therefore, is the world indebted for a very large part of its material progress since 1867.

Hawaiian Notes

By P. H. KRAFT

The new Territorial tax on contracts, at a rate of 1%, is expected to yield $90,000 in the next two years, helping to balance Hawaii's budget.

Lyman H. Bigelow, Superintendent of Public Works and Territorial Highway Engineer, has been reported to be in line for the new position of Federal representative in charge of construction. Gov. L. M. Judd favors his $7,500 a year appointment due to his experience as highway engineer. The major portion of $1,800,000 allotted to Hawaii will be used on roads and come under jurisdiction of the local administrator when appointed.

Contractors all over the Territory were pleased when it was announced **public works could be let out on contracts.** An unemployment relief tax of one-half of 1%, is expected to yield approximately $400,000 a year for the next two years and of which much will be spent on contracts.

Hawaiian Dredging Company's huge barge with a 72-foot pile driver, made the trip to Nawiliwile Kauai, with no difficulties although heavy weather was encountered, the pile driver completely assembled arrived in good condition and was put to work shortly after arrival.

Plans for the expenditure of $560,000 were made in Honolulu covering a large water works program. Drawn by Frederick Orht, manager of the water board, they were approved by both Gov. L. M. Judd and Mayor Fred Wright. Plans are for several new booster pumps, mains and reservoirs.

Federal Aid roads at Lihue, Kauai, costing $330,000 have been accepted. Projects included building of two large concrete bridges.

Proposed dredging of Pearl Harbor by the Navy Department is expected to aid in unemployment. Shore station construction would be a part of the program.

Although the Territory was **awarded $1,871,062 on road construction** from Washington, Lyman Bigelow, Superintendent of Public Works, has asked that the money be reapportioned.

New England Notes

By J. C. ALEXANDER

Coleman Brothers, Boston, have been awarded another section of the Boston-Worcester turnpike job. This is the last section and it is in the Town of Brookline and the City of Newton, Massachusetts.

The Kelleher Corporation, Turners Falls, Massachusetts, has been awarded a six mile state highway job in the towns of Conway and Deerfield, Massachusetts.

Amos D. Bridge's Sons, Inc., of Hazardville, Connecticut, have been awarded four highway jobs by the State of Maine Highway Department.

The Lane Construction Corporation, Meriden, Connecticut, has started work on the Laconia, New Hampshire state highway project.

V. Barletta Company, Boston, has started on the Shutesbury-New Salem highway job which is being done under the supervision of the Metropolitan Water Supply Commission.

Arute Brothers, Inc., New Britain, Connecticut, were low bidders on the Foster, R. I. job. Arute Brothers have practically completed their large sec-

Move More Dirt for Less Money

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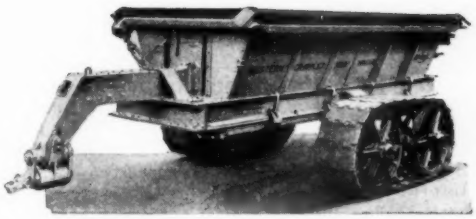

The sturdy Western 7-9 Yard Crawler Dump Wagon equipped with Western Spring Windup and Western Crawler Wheels. The Western line includes several smaller sizes and also the larger 10-13 yard wagon.

THE ability to carry capacity loads at low cost per yard is the outstanding characteristic of Western Crawler Wagons. From the cushion buffer around the top of the wagon bed to the sturdy Western Crawler Wheels which carry the load, every part is built to reduce the cost of wagon operation to the minimum.

The Western Spring Windup is standard equipment. This simple, effective device for opening and closing the dump doors can be operated either by the tractor driver from the tractor or the dump man from the ground. It is an exclusive Western feature.

Great strength, easy running qualities, fast, clean discharge, freedom from repairs combine to give high operating efficiency and a greater yardage for less money.

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WESTERN

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Shots From the Firing Line— *Continued*

tion of the Boston-Providence turnpike job.

Charles V. Reynolds, of Reynolds Brothers Inc., has been appointed a member of the Massachusetts Emergency Public Works Commission.

Advertising bids on a number of recent contracts, the **State Board of Public Roads** specified the following minimum wage schedules per hour; unskilled labor 50c, carpenters 70c, oilers 55c, master form setters 55c, master rakers 55c, roller operators 60c, compressor operators 55c, bulldozer operators 60c, stationary mixers 60c, truck drivers (vehicles of over 1½ tons rated capacity) 53c, masons 70c, blacksmiths 65c, mechanics 65c, shovel operator 75c, screed operators 60c, drill operators 55c, tractor operators 60c, plant engineers 70c, firemen 55c, master cement finishers 60c, paver operator 75c, grader operators 60c, crane operators 70c, plant electricians 70c.

New York Notes

By G. E. PETERSON

Results of highway letting held August 18th were as follows: **Andrew Weston Inc.** of Woodmere, L. I., $586,374 for 8.46 miles concrete in Suffolk County. This job included 160,000 yards of excavation and also 2,700,000 yards hydraulic fill. **The Hendrickson Brothers Company** of Valley Stream are doing the excavation. **Whitmore, Rauber & Vincenes** of Rochester, $289,085 for 12.22 miles concrete in Clinton County; **O'Grady & Quillinan** of Cohoes, $53,162 for bridge in Lewis County; **Guy Dickinson Inc.**, of Syracuse, $77,588 for 1.87 miles concrete in Onondaga County; **D. W. Winckleman Co.**, Interlacken $5,878 for bridge in Seneca County; **Intercounty Construction Co.**, of Rye, $51,295 for bridge in Sullivan County; **State Utilities Construction Corp.** of Ridgewood, $5,308 for bridge in Tompkins County; **Madison County Construction Co.**, of Solsvill, $236,683 for 7.12 miles concrete in Schenectady and Schoharie Counties; **Collins Brothers** of Mechanicsville, $199,429 for 3.28 miles concrete in Washington County; **Claudio Scialdo** of Herkimer, $4,456 for bridge in Herkimer County.

Results of highway letting held August 25th were as follows: **John Thompson** of Carthage, $199,233 for 6.80 miles concrete in St. Lawrence County; **Rochester Vulcanit Construction Co.**, of Rochester, $53,289 for 2.68 miles of macadam in Monroe County; **A. K. Van Ingen**, of Hamburg, $21,161 for bridge in Erie County; **Madison County Construction Co.**, of Solsville, $31,786 for bridge in Schoharie County; **Standard Bitulithic Co.**, of New York, $510,781 for 2.93 miles concrete in Nassau County; **Joe Murry**, of Rochester, $264,604 for 8.24 miles concrete in Cayuga County; **Manitou Construction Co.**, of Rochester, $111,508 for 3.82 miles concrete in Monroe County; **C. B. Whitmore**, of Lockport, $182,689 for 4.47 miles macadam in Niagara and Erie counties; **Lane Construction**, of Meriden, Connecticut, $282,425 for 5.47 miles concrete in Orange County; **Yonkers Rental Corp.**, of Yonkers, $40,352 for bridge in Orange County.

Results of highway letting held September 1st was as follows: **Bero Engr. & Construction Co.**, of Tonawanda, $13,517 for bridge in Cayuga County and also $216,586 for 12.10 miles concrete with black top in Erie County; **I. M. Ludingtons' Sons Inc.**, of Rochester, $67,675 for 5.16 miles grading and structures in Seneca County; **John Tata**, of Buffalo, $12,950 for bridge in Cattaraugus County; **Potter Dewitt Corp.**, of Pavilion, $90,739 for 6.20 miles macadam in Monroe County; **Vincent Schiavi & T. J. Fischer** of Buffalo, $287,953 for 3.17 miles concrete in Suffolk County; **Robert Tompkins**, of Rochester, $51,208 for bridge in Monroe County; **C. B. Whitmore**, of Lockport, $144,574 for 3.71 miles concrete in Niagara County; **John Bellardino**, of Seneca Falls, $196,398 for 5.65 miles of concrete in Tompkins County; **Patano Construction Co.**, of New York, $158,152 for 5.88 miles grading and structures in Franklin County; this job includes 250,280 yards of excavation.

Results of highway letting held September 12th were as follows: **Edw. Smith Engr. & Construction**, of Syracuse, $29,518 for bridges in Cayuga County; **Tyne-Willy Co.**, of Binghamton, $40,550 for bridges in Chenango County; **Walter S. Johnson**, of Niagara Falls, $64,969 for bridges in Chautauqua County; **Dale Engr.**, of Utica, $238,138 for 5.84 miles paving in Madison County; **Matty DeGroot**, of Ft. Edward, $44,124 for bridge in St. Lawrence County; **Highways Maintenance**, of Rockville Center, $13,704 for 0.36 miles of concrete in Nassau County; **Wm. Van Kleeck**, of New Paltz, $22,126 for bridge in Greene County; **Johnson, Drake & Piper**, Freeport, $158,062 for 2.31 miles of concrete in Westchester County; **Tully-DiNapoli Co.**, of Long Island City, $128,827 for grade separation in Queens County; **Potter DeWitt**, of Pavilion, $186,801 for 7.80 miles paving in Orleans County; **Rochester Concrete Construction Co.**, of Rochester, $251,362 for 7.16 miles concrete in Wayne County.

Lettings are scheduled in New York State for September 19th and 26th and October 3rd.

We were sorry to learn that **Jack Davis of Ryan & Davis**, suffered a rather severe stroke the latter part of August but understand that he is back on the job again.

New Jersey Notes

By H. M. DAVISON

$8,838,000 in **bridge and road construction** has been authorized in the State of New Jersey by the National Recovery Administration subject to approval of the contracts by the U. S. Bureau of Public Roads. The principal construction projects involved according to the latest revised list are:

Route	From	To	Miles	For Bridges	For Road
6	Ridgefield	Hasbrouck	3.6	$150,000	$325,000
48	New Road	Shore Road	0.6		63,000
2	Paramus	Ridgewood	5.0	75,000	650,000
1	Communipaw Ave.	Danforth Ave., Jersey City	1.5	108,000	323,000
21-25-29	Newark Junction		0.8		140,000
3	Paterson Plank Road, Secaucus	Moonachie Road, East Rutherford	2.0		163,000
25	C. R. R. Underpass, Elizabeth	Spring Street,	0.6	407,000	
29	Route 30 at Raritan	Route 28	13.4	325,000	875,000
23	Route 6 at Singac	Smith Mills	11.6	350,000	925,000
10	Succasunna	Lake Hopatcong Road Ledgewood	2.4	65,000	350,000
10	Route 5 (South of Dover)	Salem St.	4.2	110,000	250,000
37	Near Allentown		0.5	35,000	25,000
26	Underdrain Construction Trenton-New Brunswick		0.0		25,000
25	Union School House Road to Moorestown Road		3.0		200,000
25	From near New Brunswick, southerly towards Hightstown		4.0		300,000
24	D. L. & W. R. R. Overpass, Port Colden		0.5	80,000	20,000
	Ocean City-Somers Point Highway		0.8		40,000
47 & 49	City of Millville		0.8		20,000
47	Approaches to C. R. R. Crossing, Vineland		0.5		20,000
49	Port Elizabeth Causeway		0.2		10,000
44	Borough of Paulsboro		1.5		50,000
27	Shabakunk & Little Shabakunk Creek Bridges			50,000	
37 & 40	Union Branch Bridge & Pavement, Lakehurst		0.4	20,000	35,000
30	Pennington By-Pass		2.3	55,000	205,000
47	Big & Little Timber Creek Bridges		0.3	380,000	20,000
31	N. Y. S. & W. Overpass Hamburg		0.2	40,000	10,000
				$2,250,000	$5,044,000

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Shots From the Firing Line—*Continued*

The appropriation also includes $1,544,000 for right-of-way expense. The road construction covered by these projects amounts to a total of 60.7 miles.

The Government at Washington has also granted a loan of $37,000,000 to the Port of New York Authority for a mid-town vehicular tunnel under the Hudson River. This allotment is on the basis of a loan and does not contain the proviso that 30% of the total would be made as an outright grant because the tunnel is a self-amortizing project by direct toll on all vehicles using it. $10,000,000 has been allotted for the first year's work.

Anthracite Notes

Two of a kind on the **Dick-Smith Engineering Corporation** job for the Excelsior Coal Company at Excelsior, Pennsylvania. In the foreground is one of two Bucyrus-Erie 52-B electric stripping shovels and at the right a Bucyrus-Armstrong No. 29 electric blast hole drill. Drill operators H. Treadway and E. Reese are in charge of the latter machine and are most enthusiastic over its performance.

West Virginia Notes

Boso & Ritchie of Ravenswood are at work on a highway job from St. Marys to Belmont. The length of the highway under construction is three miles. There are two Lorain 75-Bs on the job excavating double shift, which consists of 90 per cent stone which is hauled by truck. During the last nine months 400,000 yards of material has been moved. One cut is overlooking the Ohio River and hanging over the B. & O. Railroad which is 120 feet high on ditch line. G. W. Fidler, and W. H. Fidler are operating one shovel and Fred Richardson and Peter Stanley the other. Bood Richie is Superintendent and Dean Hartley and F. R. Kellar are foremen.

Ohio Notes

"Chiselling" in relationship to labor or in dealing with sub-contractors on future Ohio highway contracts will bring an investigation by State Highway Department examiners and put the "chiselers" on a black list for future highway contracts or purchases according to O. W. Merrell, State Highway Director. "The State Highway Department realizes that some N.R.A. requirements are new in the highway business and recognizes that perhaps some mistakes in judgment or understanding rather than intentional deliberate violations have been made," said Mr. Merrell. "There is no reason, however, for any firm or individual receiving any highway department business to attempt to dodge the N.R.A. provisions."

Operator Fred Hall sends us a very interesting collection of pictures, several of which are reproduced above, showing recent operations of the **Marietta Contracting Company** of Marietta. The job is located 15 miles out of Wellston in Vinton County where the Marietta Contracting Company has a contract for removing the overburden and loading the coal. The coal bed from vein number seven has a good average depth of five feet, says Mr. Hall, and is being loaded out by the above Bucyrus-Erie Gas÷Air with Mr. Hall at the levers. The overburden is removed with a Lorain 75-B. The Gas÷Air loads to International trucks which haul the coal three-fourths of a mile to the tipple.

Michigan Notes

By CLYDE B. DAVIS

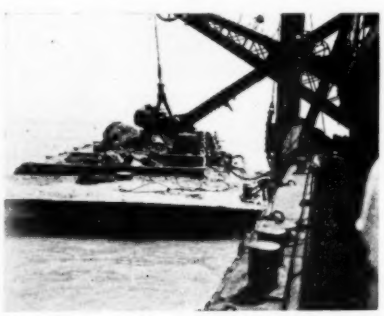
The Federal government has approved the $160,000 job of rebuilding South Division Avenue from Wealthy Street to Hall Street in Grand Rapids and will entirely finance the project. Bids were called for Sept. 22 and construction work was planned to start as soon afterward as possible.

Murray D. Van Wagoner, State Highway Commissioner, has cleared the way for an almost immediate start on the widening of Woodward Avenue, Detroit, from Grand Circus Park to the Grand Boulevard, a project which was in the courts many years and has been held up since by inability of state and county authorities to agree on methods of financing. With agreement arrived at, the commissioner sent his plans for the work to Washington and the Federal Bureau of Public Roads has approved the program. The first work to be started will be the construction of the Milwaukee Avenue grade separation, for which $575,000 is now available. For the other work $1,621,000 of the state's money is ready. The state has a contract with involved property owners providing for payments for right-of-way to be made in 10 annual equal installments. The city's half of the work has been taken over by Wayne County. The amount for purchase of right-of-way totals more than $9,800,000. The items now covered by contract, including interest due, total $5,621,000. The project will continue two years or longer.

Taylor Bros., Inc., Birmingham, have been awarded the job of building 4.4 miles of 20-foot paved road on M24 north from the Oakland County line in Lapeer County for $87,179 and the Handeyside Construction Co., Detroit gets the $93,348 job of building 4.4 miles of like road on M24 across the Oakland line to Oxford.

The powerful dredges New Jersey and Niagara now are lifting from 55,000 to 65,000 cubic yards of hard and soft clay and sand from the channel being cut through Lake St. Clair and together with the Mogul and the Great Lakes derrick dredge No. 55 are accounting for as high as 120,000 to 125,000 cubic yards daily.

No less than 15 dredges are now at work between Port Huron and Monroe, two of them the U. S. dredges Taylor and Berkley. The others are: in the Livingstone Channel, Shamrock, M. Sullivan, Governor Herrick, Empire, Coubry Rhue and the hydraulic dredge New York; at Monroe on the new harbor job, RCH No. 3, Dudley and the electric dredge Christobal; in the Lake St. Clair and Port Huron zone, Mogul, New Jersey, Niagara, Great Lakes der-



rick dredge No. 55 and the two U. S. dredges. The illustration shows the dredge Governor Herrick heaping a scow with muck and rock from the bottom of Livingstone Channel.

The M. Sullivan, at Ballard Reef, formerly was the Industry. It was bought by the U. S. Dredging Co., its

hull repaired and the Industry's machinery installed after revamping.

Bids are to be asked for soon for three new harbor and channel projects between Detroit and Toledo, lately approved by the Government. These are, a new cut in the harbor and channel at Wyandotte, which will create a deeper entrance to the channel; an approximately $2,000,000 dredging job into the entrance of Livingstone Channel and a $3,500,000 arbor job at Toledo. The Detroit dredging will cut a diagonal line into the main channel, it being determined that a new channel could be cut at less cost than the old one could be deepened. At Toledo a 25-foot channel is to be cut from the B. & O. docks above the Fossett Street bridge six miles to Lake Erie and 14 miles out into deep water.

The U. S. Government has approved 1.5 miles of grading, drainage and 20 foot surfacing on John R. road from Eight Mile road to the Nine and a Half Mile road, at an estimated cost of $73,000. Two other Oakland County projects which have the Government's approval—4.4 miles of pavement on M24 at its terminus to the county line ($85,000) and 4½ miles of road from the present airport road west to Highland road ($150,000)—together with the third development, take up practically all of Oakland County's $366,554 share of the State's Federal road building allotment.

Kentucky Notes

By W. E. CHAMBERS

On September 13th the Kentucky Highway Commission awarded contracts worth $456,228 to be financed out of the $7,500,000 allotted to Kentucky under the National Recovery Act. Among the successful contractors were: **George Gohegan** of Bardstown, a $29,505 low type surfacing job in Adair County; **Foster and Creighton** of Nashville, a $247,960 high type surfacing contract in Logan County; **Ralph E. Mills Company** of Frankfort, 7.9 miles of grading and draining for $116,688 in Metcalfe County; **Ralph Rogers & Co.**; of Bloomington, Indiana, $62,073 for low type surface in Pulaski-Rockcastle-Laurel Counties.

At the same letting two state projects were also let, **Corum Brothers** of Madisonville getting a $44,500 grading job in Hopkins County and **Cundiff and McDowell** of Somerset, approaches and a bridge at Little Beech Creek to cost $14,721.

Another letting on September 22nd covered six other N.R.A. projects including the Cumberland Falls-Parker's Lake Road which is a heavy grading and drainage job.

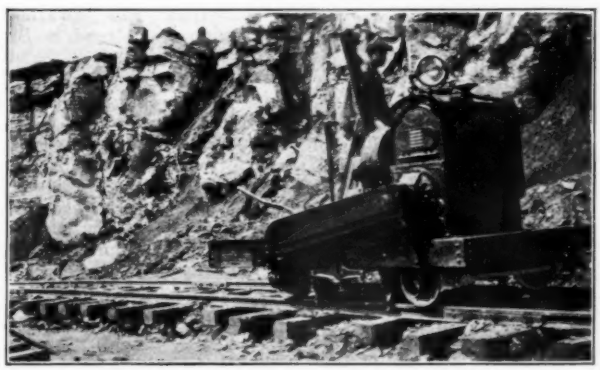
Recent Kentucky highway awards include: **States Construction Company**, Louisville, 3.9 miles of grading and draining on the Upton-Clarkson Road in Hardin County for $10,867; **Georgetown Construction Company** of Georgetown, 4.5 miles of grading and draining on the Falls of Rough-McDaniel Road in Grayson County for $34,236; **G. L. Brantley** of Winchester, grading and draining 7.3 miles of East View-Solway Road in Hardin County for $33,703; **T. J. Atkins Company** of New Albany, grading, draining and low type surfacing of one mile in Fordsville, Ohio County for $20,000; **J. M. Cain Company**, Huntington, West Virginia, 4.8 miles of grading and draining in Whitley County for $97,000.

Indiana Notes

By DAVID I. DAY

The Gast Construction Company of Warsaw started work about Aug. 1 on a concrete road job between the Illinois state line and Crown Point in Lake County. The new road will be 5.206 miles long and should be done by Dec. 1. The contract price is $143,238. In charge of this work is Robert P. Gast of Lowell. This company has arranged for the use of a 1¼ yard Bucyrus-Erie dragline, property of a Goodland concern. "About 20 men started with the job and this force will gradually be expanded to 150 men," said E. A. Gast, a member of the firm.

E. B. Campbell, the efficient Sandborn contractor, has work well under way building a 50-foot reinforced concrete arch bridge in Jefferson County in southeastern Indiana. This is due for completion on Oct. 10 with about 20 men on the work. Ben O. Mahon is in charge of construction.



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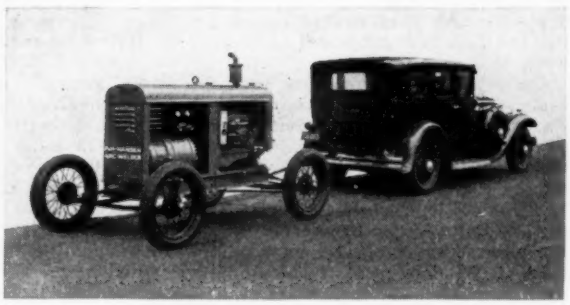

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Shots From the Firing Line— *Continued*

H. L. Maddocks of Newark, Ohio has two bridges going forward in nice shape. One is on the line between Tipton-Hamilton counties and the other is in Grant county. We can report specifically on the Grant county bridge as about 40 per cent completed on Sept. 1. It is a 2 beam and 70-foot arch structure, bid in at $12,636. It should be done by Oct. 20. 30 to 36 men are employed under the direction of Ed F. Webster.

The Vincennes Steel Corporation is going along with a bridge contract in Warren County, working about ten men at the time this is written. This is a steel on concrete bridge, scheduled for completion about Nov. 1, 1933. Cecil Stodghill is in charge.

A 3.008-mile concrete road from Michigan City to northeast was estimated as two-thirds completed on Sept. 10, just a month after the work was put under way by the **A. C. Proudfoot Construction Company** of Hammond. The road will be completed before the deadline of Dec. 31. Everything is going ahead with dispatch and it will be certainly a nice bit of highway. A. C. Proudfoot is himself in active charge of construction, starting with 20 men and working up to a peak of 120 men. Among the equipment busy were three or more Western scrapers, some Austin-Western scrapers, a Northwest 1-yard shovel and a Link Belt machine, Foote pavers, Lakewood finisher, Johnson cement bin. Mr. Proudfoot stated that he would finish the concrete slab, 42,000 yards 9" thick, 22 feet wide on Sept. 15, and shoulders et cetera by October 1—which dates will be history when this is printed.

Other jobs heard from but not seen —all said to be going forward in good shape are the **Wilmore Paving Company's** job near Jasper, the **McCoun Construction Company's** small concrete road job in Madison County; **Howard E. Stroh's** bridge job in LaPorte County; the job of the **Brookville Bridge Company**, a $14,000 bridge in Hamilton County. We hope to have more definite data on these projects next month.

Illinois Notes

Contractor Willis Rowe of Bloomington was working southwest of Carlock, building one of the state aid roads and diverting a creek channel when the above photograph was taken. The outfit consists of a big Caterpillar Diesel 75 pulling a Shaw scraper. Mr. Rowe reports fuel consumption of 30 to 35 gallons of Diesel oil per ten hour shift and costing 7c per gallon.

The L. E. Myers Company announces the removal of their offices from 20 North Wacker Drive to Suite 1314 Monadnock Building, 53 West Jackson Boulevard, Chicago.

Minnesota Notes

Barnard-Curtiss Company announces the change of their address from 504-506 Globe Building to 808-810 Phoenix Building, Minneapolis.

South Dakota Notes

By PAUL G. FRIGGENS

Contracts calling for an expenditure of $587,422 for work on South Dakota highways were awarded this month by the State highway commission. Bids were opened on 40 different projects. The largest amount of money will be spent on two concrete paving projects which total about 10½ miles in length. the contract for 5.382 miles of pavement on U. S. 77 through Elk Point was awarded to the **Western Asphalt Paving Corporation** of Sioux City for $126,202. **Booth and Olson** of Sioux City received the contract for 5.119 miles of pavement on U. S. 16 from Stanley corner to Bridgewater with a bid of $118,625. The paving will cost an average of $1.85 a cubic yard which is a little below the cost estimated by highway engineers.

Nine grading projects totaling 61.54 miles were contracted for at a cost of $233,829. Ten bridges were contracted for at a cost of $67,497. Two gravel surfacing projects were let for 15½ miles at a cost of $21,530. There was resurfacing and guard rail construction let as well.

St. Louis and Vicinity

By A. J. KOENIG

Bids were received on Aug. 25th for $1,680,000 highway work. 827 proposals were received on 127 projects. The work involves 383 miles crushed stone or gravel surface, 28 miles graded earth, 12 miles 20 ft. concrete pavement, 0.8 miles 10 ft. concrete pavement, 46 miles bituminous mat, 5 miles surface retread and 31 miles concrete patching.

Among the low bidders are Martin Wunderlich, E. L. Markham, Tobin Quarries Inc., Samples & Elsea, F. T. O'Dell, Chas. Spitkaufsky, C. H. Atkinson Paving Co., Otto Knutson, Nevada Const. Co., Graham Bros., Hyman Spitkaufsky, A. W. Mosley, Rollins Const. Co., Pope Const. Co., Carte-Harlin Co., M. E. Gillioz, Boyle-Pryor Const. Co.

Another letting will be held Sept. 15th involving 104 projects, including 50 miles concrete slab.

The U. S. Engineers office at Rock Island, Illinois, has been ordered to rush work on plans for fourteen locks on the Upper Mississippi River. The anticipated expenditure will amount to $22,000,000. The order to push the work was wired by Capt. George R. Spaulding in St. Louis, director of river improvements for the Upper Mississippi River.

Locks scheduled for the district: Cassville, Wis.; Specht's Ferry, Iowa; Gordon's Ferry, Iowa; Leclaire, Iowa; Muscatine, Iowa, No. 18 2.8 miles above Burlington; No. 21 2 miles above Quincy; No. 22 5.5 miles below Hannibal and No. 26 Alton, Ill.

The $22,000,000 to be allotted is in addition to $11,800,000 already furnished for locks and dams in the district.

The Missouri Public Works Administrator has approved four public works projects and has forwarded the applications to Washington. The projects are: downtown relief sewer in St. Louis, estimated cost $456,000; waterworks improvement at Salem, costing $40,000; sewage disposal plant at Kennett costing $38,000, and consolidated high school at Bagnell.

Contract for the construction of a bridge across the Missouri Pacific R. R. tracks on Ballas road, St. Louis county was awarded to **E. A. Brunson Const. Co.** on their bid of $5,603. Work was begun on this project.

Bids for street paving in St. Louis were awarded in August to the following contractors: Trinidad Asphalt Co.; Chase Const. Co.; Webb-Boone Paving Co.

The Sternberg Dredging Co. of St. Louis was awarded a contract for dredging the Galveston Ship channel on their bid of $204,820.

W. F. Riley & Sons Inc. was awarded contract for the River Des Peres pressure sewer in St. Louis on their bid of $87,523.

The Midwest Construction Co. has contract amounting to $130,000 for grading, curbing and paving 15th st. in Kansas City.

Martin Wunderlich was awarded contract for paving Bopp road in St. Louis county.

John C. Mullen, Fall City, Nebraska, will soon take bids for the construction of a Rulo Bridge over the Missouri River between Richardson county, Nebraska and Holt county, Missouri; involving three main spans of 380 ft. each, two deck spans 100 ft. each, 19 trestle approach spans each 50 ft.; 820 ft. earth embankment approach fill; 20 ft. clear roadway of concrete pavement.

Kansas Notes

Ellis County uses this Caterpillar Diesel 75 with the following Caterpillar power controlled elevating grader for this type of road work. The 75 Diesel is also operated on 4 gallons of Diesel oil per hour at a cost of 3c per gallon or a total cost of 12c per hour. Reported average gasoline consumption for large tractors on similar work in this locality is 12 gallons per hour at a cost of 10c per gallon which brings the saving of the Diesel to some $1.08 per hour. That makes a nice little saving for anybody's pocketbook.

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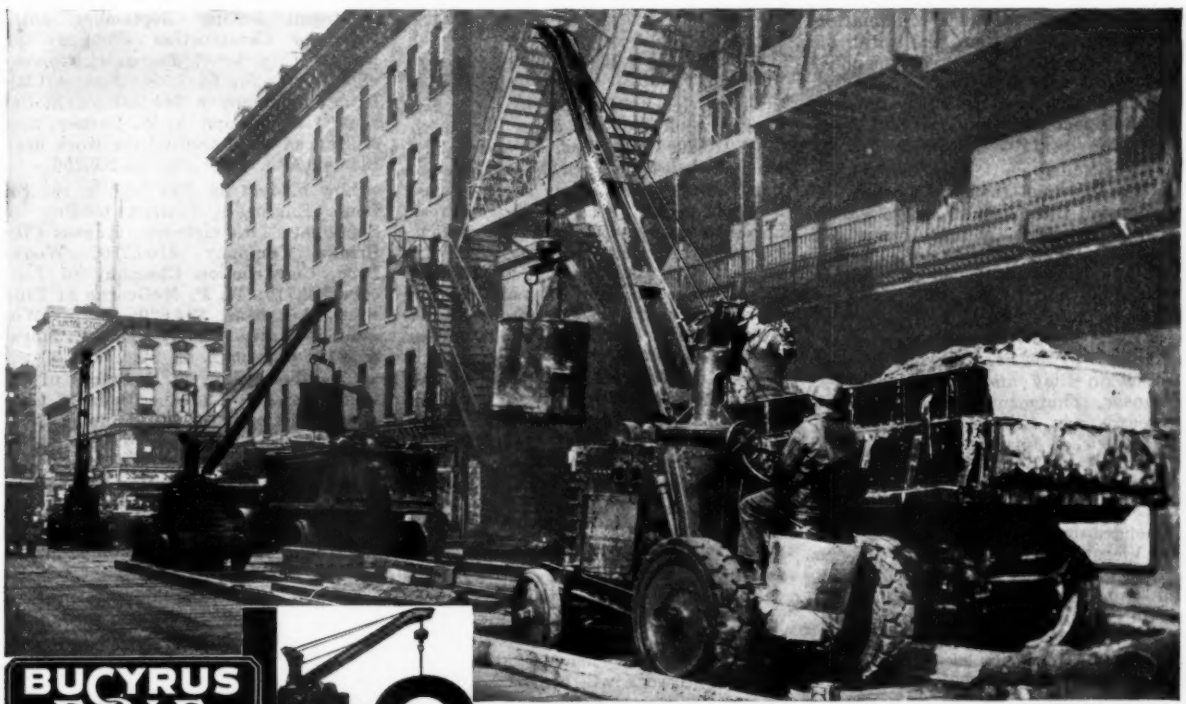

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Shots From the Firing Line— *Continued*

River Notes

It is reported that $5,000,000 worth of levees will be contracted for in a series of lettings during October by the Memphis, Vicksburg and New Orleans offices of the U. S. Engineers.

Memphis District expects to bid some 20,000,000 cubic yards early in October, possibly about October 5th.

At the Memphis bidding, September 16th contracts were offered for 14,344,000 cubic yards of earth work in the Upper St. Francis, Reelfoot, Lower St. Francis and White River Levee District. Recommended for the awards were W. S. Hardwick and Company of Beardstown, Illinois, eight items totaling 3,162,000 cubic yards at 16.89c for a total of $534,061; U. S. Government one item totaling 830,000 cubic yards at 20.37c for $169,071; Forcum-James Construction Company of Dyersburg, Tennessee, 400,000 cubic yards at 30c totaling $120,000; S. K. Jones Construction Co., of Memphis, 802,000 cubic yards at 25.7c for $206,114; Geo. W. Condon Company of Omaha, 394,000 cubic yards at 34.6c for $136,324; Driver Construction Company and H. B. Blanks of Memphis, 9,150,000 cubic yards at prices ranging from 18c to 35c per yard totaling $918,459.

A protest was filed by the Dixie Construction Co., Clarke Bros. Construction Company and Brooks-Calloway Company on the last bid above on the grounds that their combination bid figured lower than the total on which the award was recommended. The protest was taken under consideration by Major Hoge and his staff but the final decision was arrived at too late to be included in this issue.

At the Memphis letting September 7th the **Forcum-James Construction Company** of Dyersberg, Tennessee took 80,000 cubic yards at 22.9 cents and **Kochtitzky and Johnson** of Forrest City, Arkansas took 80,000 cubic yards at 29 cents and 10,000 cubic yards at 35 cents. These were in Drainage District No. 17 in Mississippi County, Arkansas. In the St. Francis Drainage District in Clay and Green Counties, Arkansas, Zimmerman and Hardwick of Beardstown, Illinois secured 112,000 cubic yards at 15.4 cents and 3,000 at 25 cents.

E. F. Powers Construction Company of West Palm Beach, Florida, was recommended by Major T. B. Larkin of the Vicksburg Engineer District, to receive the award for items 570R-A, B and C totaling 2,141,000 cubic yards on the Willow Point New Levee. The Powers' bid was 17.2 cents on items A and B and 21 cents on Item C. Items A and B are to be completed within 400 calendar days and item C by December 1, 1933.

A group of contractors consisting of **Horton-Price Construction Company,** Lake Providence, Louisiana; **John Morrow,** Greenville, Mississippi; **Charles W. Greeson,** Opelousas, Louisiana and **Harris and Brandenburg,** West Memphis, Arkansas were low bidders on items 570R-D, E, F and G totaling 1,680,000 cubic yards and were recommended to receive the contract for this section of levee in the Vicksburg District. The bid price was 18.43 cents and the average height on these sections of the Willow Point New Levee runs 27 to 28 feet. The work is located about four miles East of Sondheimer, Louisiana. Date of completion on this work is December 1, 1933.

R. T. Clark, Mike Morrisey and **John W. Noble** bidding together submitted the low bid at Vicksburg on August 23rd for constructing 1,045,000 cubic yards of the Wilman New Levee. Their bid was 18.87 cents per cubic yard. The time limit for completion is set for the first of December. This job is about four miles South of Lake Providence. The average height of levee is 28 feet.

Vicksburg opened bids September 20th for a total of 5,887,000 cubic yards. This includes 3,900,000 cubic yards near Monroe, Louisiana and 1,987,000 cubic yards between Shipland and Fitler, Mississippi. Completion date is November 1, 1934.

Vicksburg Office of the U. S. Engineers received bids on September 28th for supplying the U. S. Engineers from one to sixteen draglines of 6-yard capacity and up equipped with not less than 150 foot booms, to be supplied together with crews and used for digging pilot ditches at Worthington Point, Mississippi; Willow Point, Louisiana and Marshall Point, Louisiana for a period from 60 to 120 calendar days.

Two 24 to 27-inch hydraulic dredges were also wanted for 60 to 120 days.

New Orleans Office of the U. S. Engineers took bids on September 26th for 1,910,000 cubic yards of levees. The job included 440,000 yards on Marengo Bend Levee in the Lower Tensas Levee District; 45,000 yards on the Childress Levee in the Barataria Levee District; 175,000 yards on the English Turn Levee, 130,000 yards on the St. Thomas Church Levee, both in the Lake Borgne Levee District; 275,000 yards on the Ormond Levee and 45,000 yards on the Southport Levee in the Pontchartrain Levee District; 550,000 yards on the Potite Prairie-Krotz Springs Levee on the Atchafalaya River in Saint Landry Parish, Louisiana; and 250,000 yards on Lucky Hit Levee on the Atchafalaya in Pointe Coupee Parish, Louisiana.

New Orleans held a bidding on September 5th covering 7,000,000 cubic yards in the Lake Farrase cutoff pilot channel.

Rock Island Office of the U. S. Engineers took bids on September 29th for the construction of Dam No. 20 on the Mississippi River near Canton, Missouri. The work will consist of a cofferdam in three sections, excavation and foundations, concrete masonry, gates, service bridge and emergency bulkheads, as well as a levee, shore protection and roadway. There will be 5,040 lineal feet of cofferdam; 185,200 cubic yards of common excavation; 200 cubic yards of rock excavation and 550 square feet of rock channeling; 87,000 cubic yards of fill; 34,700 cubic yards of stonework; 149,900 square feet of steel sheet piling; 220,700 lineal feet of timber piles; 73,150 cubic yards of concrete and some ten and one-half million pounds of metal work.

Rock Island Office of the U. S. Engineers will take bids October 10th on excavating a channel in the Mississippi River in the general vicinity of Horse Island and Linwood, Iowa, to secure a minimum depth of 11 feet below the proposed upper pool level of dam 16. The excavation including 50% of overdepth will run about 110,000 cubic yards.

George W. Condon, Cunningham & Cole of Omaha, Nebraska secured a contract for 21,330 feet of pile dike and 8,400 feet of revetment near Florence, Nebraska for $765,079 at the September 12th Kansas City letting.

At the same letting **Kansas City Bridge Company** took 16,700 feet of pile dike and 9,500 feet of revetment near Brownville, Nebraska and in addition 18,320 feet of piling and 9,200 feet of revetment near White Cloud, Kansas for a total of $1,291,836.

Low bidders for dikes and revetments jobs on the Missouri River, in the Kansas City District on bidding of September 15th were: **Wickham Bridge & Pipe Company** of Council Bluffs, for $1,027,778; **C. F. Lytle Construction Co.,** Sioux City, $368,110.

At the Kansas City pile, dike and revetment letting September 13th, **Massman Construction Company** of Kansas City took jobs near Brownsville, Nebr., for $633,656; **Kansas City Bridge Company** a $44,875 job in the same vicinity; and **A. W. Farney,** also of Kansas City, secured the work near Plattsmouth, Nebr., at $1,266,256.

Low bidders on dike jobs in the St. Louis Engineers District bidding of September 14th included: **Kansas City Bridge Company** $100,750; **Woods Bros. Construction Company** of Lincoln $74,710; **W. P. McGeorge** of Pine Bluff, Arkansas, $84,820; **W. A. Wogan** of Kansas City $44,335; **Massman & Peterman** of St. Louis $123,290; **Bilhorn, Bowers & Peters** of St. Louis $88,800; and the **Badgett Construction Company** of Memphis $59,600.

U. S. Engineers Office at Cincinnati will open bids on October 3rd for the dredging and disposing of 244,146 cubic yards of material and in the Ohio River at Medoc Bar 488 miles below Pittsburgh.

In announcing the bidding on September 27th of 300,000 cubic yards near Stovall in the upper Yazoo District, the **Memphis Office of the U. S. Engineers** issue a circular specifying the new rates to be paid employees and itemizing the various classifications. Skilled labor in Iowa and Illinois is to get $1.20 with ten cents less in Missouri, Tennessee and Kentucky and a

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Shots From the Firing Line— *Continued*

second ten cents deducted in Arkansas, Mississippi and Louisiana. Unskilled labor in Iowa and Illinois gets 50 cents, 45 cents in Missouri, Tennessee and Kentucky and 40 cents in Arkansas, Mississippi and Louisiana. Included in occupations classified as skilled labor are: blacksmith, boilermaker, canvasman, carpenter, chief electrician, chief engineman, craneman, deckman, electrician, engineman, machinist, master machinist, master mechanic, operator-dragline, locomotive (steam), operator, -shovel, -tower machine, powderman, and welder. Unskilled labor includes: machine groundman, locomotive coupler, dumpman, wagon-winders, belt adjuster, root pickers, sodders, dressers, clearer, grubber, light and grease helpers, trackman, water boys, charwoman, maid and other miscellaneous labor, cook helper, waiter, and watchman. Between these two classifications is a third group called semi-skilled labor including: blademan, cook, driver-bulldozer, -team, -tractor, -truck, dumper, fireman-locomotive, -stationary, fresnoman, greaser, handyman, helper-blacksmith, -electrician, -machinist, -mechanic, lightman, loader, oiler-crane, -dragline, -shovel, -tower machine, operator-elevating grader, -grader, -locomotive (gasoline or Diesel), -tailtower, plowman, pumpman, and spotter.

Specifically exempted from the 30-hour week provided for employees are the following: chief electrician, chief engineman, civil engineers and other employees of professions and technical grades, who have to do with the planning and laying out of the work, clerk, cook, dockman (if serving as master mechanic), foreman, helper-cook, inspector, master mechanic, master machinist, quartermaster in charge of supplies, steward, spotter, superintendent, and waiter.

Arkansas Notes

By ERNEST W. FAIR

C. J. Statham, Fort Smith contractor, has been awarded the contract for removal of the old steel bridge across the Saline river at Rison. The firm of **Bird and Murphy** of Fayetteville was granted the contract for construction of the concrete piers to support the bridge with a bid of $9.25 a cubic yard. The work is expected to be completed in thirty days.

Grading, drainage and similar road work in the Cornoe bottom section of the El Dorado-Junction City highway is going forward and is expected to be completed when this appears in print.

R. T. Higgins of Hot Springs has completed the excavation work on the new three-story brick dormitory for girls at Henderson State Teachers' College at Arkadelphia.

Citizens of Camden are **planning construction of a highway** between Bearden and Fordyce running through Calhoun county.

Major W. M. Hoge, acting engineer in charge, has announced 20,000 men are to be employed on levee work in the Mississippi valley this fall and winter.

The three "mud-jacks" recently purchased by the highway commission have been used in several jobs successfully.

The Fort Smith City Commission is making plans to build a dam and lake in Oklahoma to serve this Arkansas city. Delays in solving the legal problems involved in construction of the dam and lake part of which would be in Oklahoma are causing delays. The project planned is on Lee creek, the dam, lake and pipeline to cost about $750,000 and furnish a 1,500 acre lake.

Approximately twelve miles of levee enlargement and new loop construction is to be begun shortly near Helena, extensive loops also being built near Fair Landing, Avenue and Knowltons landing.

Contracts awarded recently include: **Nelson Brothers,** Baton Rouge, Louisiana, $27,894 for twelve miles of highway work; **Flenniken Construction Company,** Shreveport, Louisiana, $27,497 for highway work; **D. F. Jones Construction Company,** Little Rock, $6,373 highway work; **Ben M. Hogan,** Little Rock, $7,585 highway work; **Martin Wunderlich,** Jefferson City, Missouri, $66,820 highway work and grading and drainage structures in Garland and Perry counties; and the **Ault-Rich Company** of Cassville, Missouri, $33,636 for highway work.

An attempt by the State of Arkansas to recover $393,706 paid Harry N. Rodgers and Forrest Jones for repair work on the fill for the Harahan viaduct at Little Rock was lost when Chancellor D. W. Dehaven of the Memphis court dismissed the suit on a demurrer. The state sued on the ground that the contract was illegal in that the project wasn't advertised and that the agreement was not signed by three members of the Highway Commission. There was no allegation that the work was unsatisfactory or the pay exhorbitant.

Oklahoma Notes

By ERNEST W. FAIR

Excavating work has been begun on a 24-acre lake on Hackberry creek, 1½ miles north of Range, near Guymon. A number of similar lakes are being planned in Texas county. All dams on these lakes are being built on section lines so that they may serve as bridges as well as dams.

Men employed under NRA program —Leo Sanders 5, Ryan Richards, Inc. 80, Dennehy Construction Co. 14,—all Oklahoma City.

By executive order Gov. W. H. Murray has created a **state department of waterways, power and flood control** to supervise municipal, county and state projects. Col. Clarence B. Douglas of Tulsa, E. E. Blake and H. A. Hatcher of Oklahoma City are board members. The commission will have particular control over all matters of flood control, irrigation, navigation and power on waterways, this jurisdiction extending to investigation and approval of contracts and projects as well.

Plans are being made for a **giant dam project** on the Red River between Oklahoma and Texas. The dam is to be near Denison.

CARL GRAY
IVAN R. RICHARDSON

Funeral services for Carl Gray, 65 years old, retired contractor, were held in Oklahoma City, following his death from a heart attack. Ivan R. Richardson, 59 years old, another Oklahoma City contractor, died recently following an illness of two months.

Leo Sanders, Oklahoma City, one of Oklahoma's best known contractors, was the recent victim of a holdup, having been robbed when a young gunman stepped into his garage as Sanders was putting his car away for the night.

A flood-control project consisting of considerable excavating, drainage work and dam building is being planned north of Tulsa on Elm Creek.

Among projects now being begun or upon which contracts are to be let shortly; raising of water dam and spillway repairs at Henryetta—$6,050, water works system at Wayne—$32,142, sewage works improvements, Oklahoma City—$16,286, water works improvements, Oklahoma City—$1,749, county courthouse, Grady county at Chickasha—$200,000, three new dormitories at Chickasha, Oklahoma College for Women—$150,000 and concrete athletic stadium, Oklahoma A and M College, Stillwater—$40,000.

Three state highway projects have been begun with bids being let as these paragraphs were being written. These include grading and drainage in Ellis County, estimated at $107,400; same Major county, estimated cost $155,900; and in Woods county with an estimated cost of $68,300.

Texas Notes

By GEO. A. CARLSON

The interesting picture taken last December above shows four of the **Trinity Farms Construction Company's** 2-W Bucyrus-Monighan draglines completing one of their levee contracts near Hillhouse, Mississippi.

Colorado Notes

By H. M. BIBAUD

Expenditure of $327,000 of **Forest Highway funds** for forest highways construction is provided in six construction agreements entered into by Colorado and United States Department of Agriculture which have been approved by acting Governor Ray H. Talbot.

With the agreement signed the Forest Service will prepare plans and let contracts. The amounts to be expended follow: between Nederland and Central City, five miles $75,000; through Buffalo, between Deckers and Rine, 1.4 miles, $40,000; between Dillon and Frisco, on the Loveland Pass highway, three fourths mile, $24,000; between Echo Lake and Idaho Springs, on the Chicago Creek road, 13.58 miles, $48,000; on Tennessee Pass, 29.94 miles, northwest of Leadville, $120,000.

A new grant of $700,000 for expenditure in the next two years on National Forest highways in Colorado has been authorized according to word received from Washington September 9th by J. A. Elliott, Denver District Engineer of the Bureau of Public Roads. One of the chief Colorado projects is the oiling of the Mount Evans road at a cost of $50,000. Other projects included are: Rabbit Ear Pass, $70,000; Dolores-Rico, $50,000; Black Mesa, $80,000; Tennessee Pass, $70,000; Berthoud Pass, $82,000, South St. Vrain canyon, $100,000; Pagosa Springs-Chama, $6,000; betterments on existing roads, $20,000; surveys, $14,000; gravel surfacing 1.542 miles on highway 50, east from Salida; gravel surfacing on 3.603 miles south of Durango on the Bondad road.

A public works program for $6,164,050 is to be put underway within the month on Indian reservations including $125,000 for improvements in Colorado. Virtually all of the money on Indian projects is for improvement of Indian lands and irrigation facilities. The expenditure in Colorado is to be on the Pine River reservation in the southwestern part of the state.

Engineers, irrigation experts and farmers from Larimer and Weld Counties met August 29th to take preliminary measures toward realization of the **10-million-dollar diversion tunnel** which would bring water under the continental divide from Grand Lake. L. L. Stimson, Greeley engineer. described the plans for the tunnel, twelve miles long and to carry an estimated 2,000,000 acre feet of water per year. The tunnel would divert waters from the western slope to the Big Thompson and would furnish additional water to most of Weld and Larimer Counties.

Little hope for any large amount of highway construction this fall is held out by State Highway officials. Almost all the municipal projects released by the Bureau of Public Roads cannot be undertaken during the winter. Principal among them are penetration macadam surfacing at Craig, Leadville, Limon, Montrose, Steamboat Springs, totaling $125,000, paving at Platteville, Las Animas and Walsenburg, $85,000 and underpasses at La Junta and Gypsum totaling $125,000.

$50,000 has been allotted to Durango for paving. This sum comes from the $1,640,000 budget approved for the 38 Colorado municipalities under the National Recovery funds. Other municipalities that received aid are Delta, $20,000 for paving, Montrose, $30,000 for paving.

R. F. Walter, Chief Engineer of the Denver office of the government reclamation bureau, announced Thursday the appointment of **H. W. Bashore** as head construction engineer for the **Casper-Alcova project.** Mr. Bashore, who has been connected with the reclamation service twenty-eight years, proceeded to Casper immediately to prepare preliminary construction plans. A quarter million dollars will be made available immediately for preliminary work.

NEWTON WILCOXON

Newton Wilcoxon, 82, a retired construction engineer and a resident of Denver twenty-two years, died September 8th at his home, 1230 Clarkson Street, from a sudden heart illness.

New Mexico Notes

Successful bidders at the State Highway Department letting September 15th were: **Heafey-Moore Company** of Oakdale, California—$145,686; **Everly & Allison** of Albuquerque—3 contracts ($189,815, $63,768, and $40,568); **New Mexico Construction Company,** Albuquerque—$253,014; **Skousen Brothers,** Albuquerque—$80,382; **Lee Moor Construction Company** of El Paso, Texas—$64,695; **Dudley Stone Products Company,** El Paso, Texas—$85,703.

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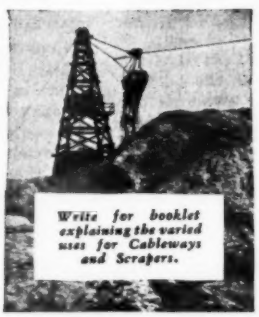

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Shots From the Firing Line—*Continued*

The low bidders at the New Mexico State Highway bidding at Santa Fe August 6th on various National Recovery Highway projects with the amounts of their bids follow:

Skousen Brothers of Albuquerque $52,629; **Capital Construction Company** of Santa Fe and **Dudley Stone Products Company** of El Paso, $57,916; **Lee Moor Contracting Company**, El Paso, $152,230; **Leone Brothers** of Trinidad, Colorado $22,169; **Armstrong & Armstrong** of Roswell, $90,247; and **Cook & Ransom** of Ottawa, Kansas, $91,470.

Very close bidding was the rule and on one $90,000 project a spread of $50.00 separated the first two bidders with only $500 between the second and third bidders.

Through the courtesy of **A. D. Gale** of Albuquerque we present the accompanying illustrations of two of the Bucyrus-Erie 50-B Diesel draglines working for the **Middle Rio Grande Conservancy District.** The upper view shows dragline number 125 working on the Los Padillas Drain. During the month of June this machine excavated 132,730 cubic yards. The operators responsible for this excellent performance were Joe Victor, O. O. Miller and Geo. Hart.

The other machine is number 127 working on the Albuquerque Main Canal. During the month of June this machine turned out a record of 115,203 cubic yards for which operators W. W. Snyder, J. B. Kelly and Ed Odle deserve due credit.

Montana Notes

By PAUL G. FRIGGENS

Petitions are being circulated in three states in support of a proposed $72,000,000 federal loan for completion of a **602 mile railroad** from Miles City, Montana, to Craig, Colorado. The road would be laid across central Wyoming and efforts toward this end today have revived the west's oldest project of its kind, hopes for which have flowered and withered alternately for ten years. The petitions set forth that authorization of the loan would provide work this year for 81,000 men, and that permanent employment would be provided for no les than 40,000 by operation of the road and development that would be encouraged along the route. Promotion of the road was begun in 1923 but financial reverses stopped the movement.

There has been an allotment of $2,765,000 by the Public Works Board for **construction work on four irrigation projects** in Montana. Work on the Milk river, Bitter Root and Sun river projects will be started immediately. The fourth project, the Chain Lakes storage dam on the Milk river will be started later. It will be the most important in the group so far.

Another letting of contracts for road improvements will be held September 28 by the Montana state highway commission. Approximately 150 miles of road will be improved and 49 bridges and other structures built under contracts awarded earlier this month. The total cost will be about $1,671,000.

Topping the list so far as outlay is concerned is the 1,169 foot bridge, a steel span, over the Missouri on the Culbertson-Sidney road in Roosevelt and Richland Counties. This project will cost $305,156.

Arizona Notes

By H. M. BIBAUD

Members of the Highway Commission early in September voted to transfer $145,000 to United States Highway 60 for use in road construction east of the Salt River on the Globe-Showlow section, subject to the Bureau of Public Roads approval and conditional on the forest service oiling a section of 66 near Ashfork.

Construction work on the new short route Bush highway to Payson has been in progress since last spring. Twenty-four miles have been completed and only about twelve miles of new construction remains before connecting with the present Payson route.

Sealed bids were received by the Bureau of Public Roads at Phoenix, September 21st for grading 70 miles of Section D, Route 10, on National Forest Highways, in Gila and Conconino Counties. This work on the "Strawberry Hill" route will be in charge of Supervisor H. Sweetser, District Engineer of the regional U. S. Forest Service.

Bids for three road projects involving an expenditure of $811,708 were received September 26th by Thomas S. O'Connell, State Engineer. The new projects bring the total amount of road work on which bids were received this month to approximately $1,600,000. It is estimated that approximately 2,000 men will be put to work on these Public Works Program projects. The projects bid the 26th call for $662,000 on the west end of the U. S. 60 and $149,700 on the Ashfork-Kingman sector of U. S. 66. The contracts on 60 call for grading and draining 18.7 miles starting just west of Salome and extending northwest toward Ehrenberg, and 10.8 miles starting at the Maricopa County

line and running east toward Wickenburg.

Work will begin at once on a $2,650,000 Federal program to complete development of the 100,000 acre San Carlos project, C. H. Southworth, District Engineer, announced. 50,000 acres of Indian lands and 50,000 acres of public lands will be brought to full cultivation from waters of the Gila River impounded behind multipledomed Coolidge Dam, under the program. 300 to 600 men will be employed in building canals, laterals, pumping plants and transmission lines to cost $165,000,000 and in clearing up raw lands at the cost of another $1,000,000. An 80-mile transmission line from Coolidge Dam to the project proper (for operation of pumping) is planned. Arizona copper will be used. A. H. Kneala, Superintendent of the Gila River Indian Reservation, will be in charge of the work.

Wyoming Notes

By PAUL G. FRIGGENS

Ten public works projects involving an estimated expenditure of almost one and one-half million dollars have received the approval of the Wyoming public works advisory board. On three of the contemplated projects, preliminary work had advanced to the extent that work can be started immediately upon the approval of federal engineers. These projects are: The Casper Mountain road in Natrona County, estimated expense, $13,500; the Guernsey Lake road in Goshen and Platte Counties, estimated expense $250,000, and a swimming pool at Rock Springs, estimated expense of $10,000.

Other projects approved by the advisory board and the estimated expenditure are include: Drainage in the Eden valley in Sweetwater county, $40,000; the so-called Hines project in Sweetwater county, involving preliminary work for commercial development of mineral resources, $800,000; improvement of the Cody-Yellowstone park road, $270,000; Medicine Bow water system in Carbon county, $45,000; extension of the power line from Wheatland to Chugwater, to transmit power from the Guernsey dam, and an irrigation project in the Red desert in Sweetwater county, $10,000; the Tensleep meadows and drainage project, $75,000.

Preliminary information is being prepared on sixteen other projects which will involve an expenditure of about $1,000,000. Some of these include construction of an oil pipe line costing about $575,000 in Fremont county; $15,000 for a swimming pool in Evanston; $30,000 to replace water pipes in Buffalo and three-fourths of a million dollars in Cheyenne to add to water system.

Nevada Notes

By H. L. LIVINGSTON

H. A. Anderson of Sacramento, who bid $21,314 to the Bureau of Public Roads, has been awarded the contract for grading 1.304 miles of road of the Lake Tahoe National Forest Highway, Washoe County.

Oregon Notes

At the State Highway Department bidding August 24th, **Theodore Arenz**, Portland, secured a $91,937 grading contract on 4.09 miles of the Dixie-Lime Section of the Old Oregon Trail in Baker County. Mr. Arenz was also successful in securing 1.44 miles of regrading and paving in Multnomah County on Columbia Boulevard-S. P. & S. Undercrossing Section on Secondary Highway No. 120 on a bid of $51,272. He also took one culvert and five bridges over the Burnt River on the Dixie-Lime Section in Baker County for $50,873.

Fred H. Slate of Portland took a heavy section of grading on 1.34 miles of the North Fork-Humbug Mountain Section of Wolf Creek Highway in Clatsop County on his bid of $124,950.

Fisher Brothers of Oregon City bid $95,752 and took the contract on the Odell Lake Section of the Willamette Highway in Klamath County. The work consists of 4.26 miles of grading.

Myers & Goulter of Seattle bid in 4.86 miles of grading on the Middle Fork-Flowers Gulch Section of the Pendleton-John Day Highway in Grant County for $192,730.

Jacobsen-Jensen Company of Portland received the award for 2.4 miles of grading on the Mills Bridge-Deadman Creek Section of the Wilson River Highway in Tillamook County on their bid of $37,614.

California Notes

By H. L. LIVINGSTON

Highway work in California has been virtually at a standstill for the year of 1933. An enormous amount of money is now available and bids and specifications have been issued for a large number of highway jobs on which work will be started during October. $59,352,438 will be spent for construction and maintenance of highways and bridges in the 21-month program started October 1st.

George Pollock Company, Sacramento, has been awarded the contract by the U. S. Bureau of Public Roads for grading 6.237 miles of the Sonora Pass National Forest Highway in the Stanislaus National Forest, Tuolumne County, California. The amount of this contract is $143,829 and the principal item in the contract is 275,000 cubic yards of unclassified excavation.

Eaton & Smith of San Francisco, who bid $96,540 have been awarded the contract for grading, paving and constructing a reinforced concrete bridge on the extension of Junipero Serra Boulevard through the town of Colma, San Mateo County. The excavation on this job, amounting to 80,000 yards will be done by **R. A. Farish**, San Francisco with his Bucyrus-Erie Gas+Air shovel.

An allocation of $70,000,000 has been made by the **Public Works Administration** to the U. S. Engineers' Offices throughout the United States. The following amounts have been allowed for projects in California:

San Diego Harbor (1 project)	$124,500
Los Angeles & Long Beach Harbor (1 project)	$1,650,000
Monterey Harbor (1 project)	$240,000
Richmond Harbor (1 project)	$ 95,000
San Joaquin River (4 projects)	$990,000
San Francisco Harbor 2 projects)	$275,000

Bids on these projects will be issued shortly by the local offices of the U. S. Engineers.

All bids submitted to the Metropolitan Water District of Southern California for the construction of the **East Eagle Mountain Tunnel** have been rejected. This project will, therefore, be delayed for several months at which time it may be done by contract or by district force account.

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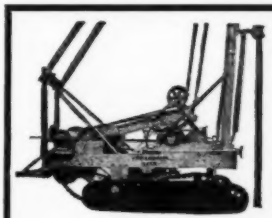

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Size 44 "Clipper" comes equipped with steel frame; steel or wooden mast, wire or manila line.

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Established 1842

THE LOOMIS MACHINE CO., K STREET TIFFIN, OHIO

For your convenience in writing to the advertisers on this page, you will find a card bound in this issue.

Not in the Contract

Contractor's Son—"I don't want to go to that damn school any more!"

Father—"Why, Willie, where did you ever learn such a word as that?"

Contractor's Son — "Why, William Shakespeare uses words like that."

Father—"Well, then, quit runnin' around with him."

Mountaineer: You dirty skunk! You're a-goin' to marry my daughter!

Skunk: Y-y-y-yessir. Which one?

"When I marry, I'm going to cook, sew, wash and darn my husband's socks, lay out his pipe and slippers, and read to him evenings. What more could a husband ask than that?"

"Nothing, unless he were evil-minded."

Operator: Listen, baby, couldn't you come up to my apartment for about an hour this evening?

She: Thanks, but I have no time to spar.

Voice on 'Phone: I want to drown my sorrows in drink. Send over some of that three and two-tenths per cent beer.

Dealer: Yes, sir. How many dozen cases, sir?

"I wonder what's wrong with that pretty little dame over there," said a dancer to a contractor at a convention supper-dance. "An hour ago she was as sweet a little petter as you'd want to see. Now she cuts me dead."

"I think she sees me," replied the newcomer dryly. "She's my wife."

The jury had acquitted the defendant of stealing contractors' tools, because of the powerful plea of his lawyer.

"Honor bright now, Bill," said the lawyer as the two left the courthouse, "you did steal those tools, didn't you?"

"Well, now, look here. I'll be honest with you. I always did think I stole that junk until I heard you make that speech to the jury. Now I'll be dog-goned if I ain't got my doubts about it."

First Levee Dresser—My gal am so black when she cuts her finger, the blood am black.

Second L. D.—Boy, you ain't saw nuthin' yet, my gal am so black when she coughs it takes thirty minutes for the soot to settle.

"What is your age, madam?" asked the clerk at the polls.

"I've seen thirty summers."

"And how long have you been blind?"

A bishop, one night, at an art exhibition, noticed a young man promiscuously hugging and kissing a marble bust of a woman and deriving a great deal of enjoyment out of it. The bishop approached him.

"Young man," said the clergyman, "a good Protestant wouldn't do that."

The young man continued his maneuvers.

"I'm not a Protestant," he answered.

"Well, a good Catholic wouldn't do it."

"I'm not a Catholic."

"A good Jew wouldn't do it either."

"I'm not a Jew."

"Well, then, what are you?" asked the bishop.

"I'm a Christian Scientist and I'm necking my girl in Denver."

The technocracy craze collapsed even before anyone could think up any good jokes about it.

Traffic Cop: "Come on. What's the matter with you?"

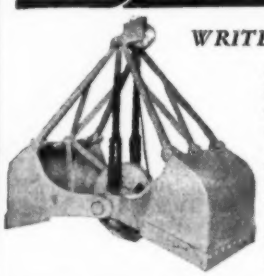
Exasperated Truck Driver: "Oh, I'm well, thanks, but my engine's dead."

Oiler: "This tonic is no good."

"Operator: "What's the matter?"

Oiler: "All the directions it gives are for adults, and I never had them."

Hayward Buckets



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ONE COMPLETE NARROW GAUGE DIRT MOVING OUTFIT including shovel, camps, shop and haulage equipment. Located near Fort Wayne, Indiana. Can you use it?

54 Steel bunks with mattresses and bedding. Mattresses and bedding are sewed up in burlap.
6 Heating stoves.
50 Shovels and picks, approximate.
5 Wagons and boxes. Light wagons about 2¾ axles.
1 Fairbanks Morse gasoline engine and 5x5 bulldozer pump 3 HP.
2 Fairbanks Morse gasoline engine and 3x5 bulldozer pump 1½ HP.
4 Track jacks, 15 ton.
3 Track jacks light.
1 Duplex Pump—Worthington, 5¼x3½x5.
10 Slips.
1 Anvil.
1 Forge.
6 Switches.
4 Frogs.
10 Switch points.
2 Wheelbarrows.
2 Each, scythes, hand saws, cant hooks, spike malls.
1 Carbide light.
1 Kitchen outfit.
1 Set boiler tubes for steam shovel.
30 Western dump cars, 5-yard.
2 Davenport locomotives, No. 2039 and No. 2040, weight about 20 tons.
1 Bucyrus 50-B Steam Shovel No. 4368.
1 36x84" vertical boiler.
1 6" centrifugal pump with upright engine attached.
2 Galvanized water tanks, wagon size.
100 Timbers, 10x12x16'.
12 Timbers 10x12x32'.
1 Chevrolet touring car, 1924 model.
1 Ford 1-ton truck.
1 Best Caterpillar tractor (30).
About 800 pieces of pipe, size 1½ and 2", random lengths.

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Old Times & Old Timers

(Continued from page 407)

changed barrels. No trouble to make a water tank in Sammie days. There is no use to explain the power of the boom engines. The old timer knows just how to set the Vulcans when they slip . . . just stay at home for a couple of weeks and the crowd engine will get its strength back. Old Sammie must have been a good luck piece for each of these men on the Sammie crew is still living. Since this picture was made in 1906 old Sammie has done her part and has been left in a big cut to remain the rest of her days."

May Old Sammie rest in peace, so say we all. And thanks to Old Timer Jackson for the story.

More on the Kilgore Shovel

FROM OLD TIMER T. F. McMenamin of Denver comes this further discussion of the Kilgore first mentioned in this column by Old Timer J. F. Sullivan and described by Dinkey Skinner Vernon L. Smith in our April issue.

"The Kilgore steam shovel that Mr. Smith describes is one of the models that came out in the late fall of 1903, and was a horizontal cylinder type. Previous to this model, the inventor, Frederick O. Kilgore of the Kilgore Machine Co., Minneapolis, Minn., had built two or three with vertical engines. One worked stripping at the Kettle River Quarries, located at Sandstone, Minnesota.

"Their advertising brought out the principle of using the steam cylinder for the different operations; dispensing with the usual equipment of hoisting engines, drums, chains or cables, clutches, and so forth. Gearing was used to propel only the road wheel type machine. A train of gearing connected the engine with the forward axle. In the railway shovel, the usual sprocket chain was used from a center shaft to forward and rear axle. The railway type was a 2½-yard capacity; the road wheel type, 1¼-yard capacity. The under frame was 26x9½ feet.

"Another feature that they stressed was the way in which the crowd could be used in case the front trucks jumped the tracks. All that had to be done was to place the bucket on the floor of the pit, and to use the crowd to jack up the frame while replacing the wheels.

"Digging radius: from the center of the mast to the face of the bucket was 25 feet 10 inches. Vertical reach from rail to top of bucket when in its highest position, 25 feet. The 1¼-yard machine weighed 30 tons; the 2½-yard machine, 65 tons.

"The special features of this type machine were in the method of handling and operating the dipper by the cylinder on the boom and also the vertical cylinder within the mast. I understand this type was slower as it made it necessary to move up oftener as the dipper sticks did not have the in and out reach of other makes.

"This machine would have been in its element if it had been in the Culebra Cut at Panama when Runner LaRue made his record with the 95 Bucyrus, as he did not have to move up in an eight hour shift when the cut kept sliding to him and he had to keep digging or back up."

Thank you, Old Timer McMenamin, and let's hear something further on the adventures of the Old Timers of the Panama gang. There were many a record and many a thrill in the old days when the Canal was being pushed through the jungles of the Isthmus that will make yarns worth telling.

Status National Recovery Highway Funds

The following tabulation shows number of N. R. Federal-aid projects approved and awarded, the estimated employment and the accumulative total of N. R. H. funds obligated to September 18, 1933, according to information from Bureau of Public Roads, U. S. Department of Agriculture.

State	Total No. of Projects Approved	Amounts Obligated	Estimated Employment	No. of Projects Awarded
Alabama	7	$ 920,000	825	
Arizona	24	2,190,000	1,975	
Arkansas	7	184,000	178	3
California	50	7,813,000	5,395	5
Colorado	26	1,573,000	1,775	7
Connecticut	1	36,000	150	
Delaware	18	620,900	1,440	9
Dist. of Col.	7	866,000	1,020	5
Florida	8	877,000	640	2
Georgia				
Idaho	28	2,403,000	2,206	14
Illinois				
Indiana	16	2,274,000	2,910	
Iowa	65	3,719,000	3,802	39
Kansas	50	1,985,000	3,202	
Kentucky	24	1,264,000	2,043	
Louisiana	14	2,284,000	1,631	4
Maine	97	759,000	6,140	93
Maryland	2	187,000	180	
Massachusetts	10	999,292	1,368	9
Michigan	25	1,606,000	2,640	5
Minnesota	112	3,426,000	3,977	50
Mississippi	6	394,000	360	
Missouri	66	4,134,000	4,743	
Montana	38	3,219,000	2,850	17
Nebraska	68	3,365,000	6,773	43
Nevada	12	720,000	675	7
New Hampshire	3	194,000	355	1
New Jersey	6	1,110,500	1,215	
New Mexico	26	1,715,000	1,785	22
New York	109	14,276,000	15,083	44
North Carolina	46	1,751,000	2,910	29
North Dakota	61	1,357,350	3,520	18
Ohio	73	5,304,000	7,995	16
Oklahoma	48	2,917,000	3,038	17
Oregon	43	3,049,000	2,370	31
Penn.	8	644,000	890	
Rhode Island	8	968,000	1,105	
South Carolina	25	959,000	1,575	
South Dakota	40	1,417,000	3,104	20
Tennessee	8	722,000	615	
Texas	81	3,923,000	5,892	25
Utah	44	2,538,000	3,369	26
Vermont	12	518,812	1,203	9
Virginia	16	612,300	1,339	6
Washington	36	2,763,000	2,105	20
W. Virginia	30	1,744,600	2,700	17
Wisconsin	60	3,520,000	5,500	36
Wyoming	57	2,789,000	2,261	51
Total	1,632	$103,578,754	129,917	702

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SHOVELS-CRANES DRAGLINES

P&H MODEL 208—45' BOOM DRAGLINE Cats—15½' long, 9' wide, 22" Treads. 100 HP. Waukesha High Alt. Engine. SCD-1.

AMERICAN 1 CU. YD. GASOLINE SHOVEL. Motor overhauled 1932. Good value. SCD-3.

P&H MODEL 600—40' BOOM CLAMSHELL. Waukesha 75 HP. Engine. New 1929. Dragline and Shovel equipment also available. SCD-4.

ORTON ⅝ YD. GASOLINE SHOVEL. New 1928. Make an offer. SCD-5.

P&H MODEL 600. New 1929. 20' Boom, 14'3" Dipper Handle, 1 cu. yd. Dipper. Waukesha 75 HP. Engine. Dragline and Clam Shell Equipment also available. SCD-7.

BUCYRUS-ERIE MODEL 30-B DIESEL—25'9" Boom, 14' Dipper Handle, 1 yd. Dipper. SCD-9.

BAY CITY TRACTOR TYPE—CHAIN CROWD —¾ YD. SHOVEL. Cat Mounted. McCormick-Deering Power Unit. Excellent condition. SCD-10.

OSGOOD "CONQUEROR" GAS—1¼ CU. YD. SHOVEL—Brand New LeRoi Engine. Clamshell Equipment also available. SCD-18

MONIGHAN MODEL 1-W, WALKER — 60' Boom Dragline, 1¼ cu. yd. Page Bucket. Good condition. SCD-13.

P&H MODEL 600—40' BOOM DRAGLINE. Waukesha 75 HP. Engine. New 1929. Shovel and Clamshell Equipment also available. SCD-14.

BAY CITY TRACTOR TYPE CLAMSHELL. NEW 1928. Excellent condition. Shovel Equipment also available. SCD-15.

BUCYRUS-ERIE SLIGHTLY USED-LOAD-MASTER TRACTOR CRANE—14' Boom—Rubber tired wheels—Rated lifting capacity 4500 lbs. McCormick-Deering Power Unit—New Machine Guarantee. SCD-17

COMPLETE FRONT END EQUIPMENT

Shovel Equipment

¾ CU. YD. DIPPER—23' BOOM—15' DIPPER HANDLE—Extra High Lift Rope Crowd Shovel Equipment suitable for Models 1030 or 1035. **Brand New.** SE-2.

¾ CU. YD. DIPPER—23' BOOM and ENGINE —12'6" DIPPER HANDLE—Shovel Equipment suitable for 20-B Steam. **Brand New.** SE-15.

¾ CU. YD. DIPPER—26' BOOM and ENGINE —17' DIPPER HANDLE—High Lift Shovel Equipment suitable for 30-B Steam. **Brand New.** SE-16.

¾ CU. YD. DIPPER—25'9" BOOM—14' DIPPER HANDLE—Shovel Equipment suitable for 30-B Diesel. **Brand New.** SE-17.

⅞ CU. YD. DIPPER—23' BOOM—15' DIPPER HANDLE—High Lift Rope Crowd Shovel Equipment Complete suitable for Model 1030 or 1035. Rebuilt—New Equipment Guarantee. SE-22

⅞ CU. YD. DIPPER—21'9" BOOM and ENGINE—15' DIPPER HANDLE — High Lift Shovel Equipment. Suitable for 31-B Steam. **Brand New.** SE-18.

1 CU. YD. DIPPER—26' BOOM—15' DIPPER HANDLE—Rope Crowd Shovel Equipment suitable for Model D-2. **Brand New.** SE-3.

1¼ CU. YD. DIPPER—25' BOOM—17' DIPPER HANDLE—Slightly Used Rope Crowd High Lift Shovel Equipment suitable for Model 37-B. **New Machine Guarantee.** SE-5.

1½ CU. YD. DIPPER—23'6" BOOM—15' DIPPER HANDLE—Slightly Used Rope Crowd Shovel Equipment suitable for Model 37-B. **New Machine Guarantee.** SE-6.

1½ CU. YD. DIPPER—27' BOOM—17' DIPPER HANDLE—High Lift Rope Crowd Shovel Equipment suitable only for Bucyrus-Erie 43-B machines. Rebuilt—New Equipment Guarantee. SE-23.

Clamshell Equipment

40' BOX BOOM CLAMSHELL EQUIPMENT INCLUDING ROPES. Suitable for Model D-2. Brand New. CS-3.

Dragline Equipment

35' CHANNEL BOOM, FAIRLEAD AND ROPES but not including bucket. For use on Model D-2. DL-2.

40' CHANNEL BOOM, FAIRLEAD AND ROPES, but not including bucket. For use on Model D-2. DL-3.

40' BOX BOOM, FAIRLEAD AND ROPES, but not including bucket. For use on Model D-2. DL-4.

45' BOX BOOM, FAIRLEAD AND ROPES, but not including bucket. For use on Model D-2. DL-5.

40' CHANNEL BOOM, FAIRLEAD AND ROPES, but not including bucket. For Model E-2. **Brand New.** DL-6.

45' CHANNEL BOOM, FAIRLEAD AND ROPES, but not including bucket. For Model E-2. **Brand New.** DL-7.

40' CHANNEL BOOM, FAIRLEAD AND ROPES, but not including bucket. For Model 30-B Diesel. **Brand New.** DL-8.

45' CHANNEL BOOM, FAIRLEAD AND ROPES, but not including bucket. For Model 30-B Diesel. **Brand New.** DL-9.

BRAND NEW Ropes included with each of above Dragline Equipments.

All of above equipment is BRAND NEW and of BUCYRUS-ERIE manufacture.

Trench Digging Equipment

¾ CU. YD.—36" WIDE SOLID TYPE DIPPER, 21' Boom, and all auxiliary equipment for application to **Model 1030.** Will dig to maximum depth of 18'. DS-3.

BRAND NEW PAGE, two dippers each ¾ cu. yd., one 38" wide over cutters, the other 49½" wide over cutters. 17'1½" Boom and all necessary auxiliary equipment. Will fit Bucyrus-Erie 1030 or 1035. DS-7.

BRAND NEW Ropes included with each of above Trench Digging Equipments.

DIPPERS

Small Machines

2 ⅝ CU. YD.—Plate.—Will fit 20-B Steam or Gas. Brand New. D-12

1 2/3 CU. YD.—Plate front.—Will fit 14-B. Brand New. D-13

1 ¾ CU. YD.—Rock type.—Will fit 30-B Gas or Diesel. Brand New. D-14

1 ¾ CU. YD.—Rock Type.—Will fit 20-B Steam or Gas. Brand New. D-15

4 ¾ CU. YD.—Plate front.—Will fit 1030 or 1035. Brand New. D-16

1 ¾ CU. YD.—Cast Front Inserted Tooth. Will fit 1030 or 1035. Brand New. D-17

2 ⅞ CU. YD.—Plate front.—Will fit 1030 or 1035. Brand New. D-18

1 ⅞ CU. YD.—Plate Front. Will fit 18-B. Brand New. D-20

1 ⅞ CU. YD.—Rock type. Will fit 31-B. Brand New. D-21

1 1 CU. YD.—Rock type. Will fit D-2 or 31-B. Slightly Used. D-22

1 1¼ CU. YD. INSERTED TOOTH. Will fit GA-2 or GA-3. Slightly Used. D-25.

1 1¼ CU. YD.—Plate front. Will fit E-2, 41B or 42-B. Slightly Used. D-26

2 1¼ CU. YD.—PLATE FRONT. Will fit E-2. Brand New. D-27.

1 1½ CU. YD.—PLATE. Will fit E-2. Brand New. D-28.

2 1½ CU. YD.—Manganese Front Inserted Tooth. Will fit E-2, 41-B or 42-B. Slightly Used. D-29

1 1½ CU. YD.—Vanderhoef type with Vanderhoef teeth. Will fit E-2 or 42-B. Slightly Used. D-30

Large Machines

1 2½ CU. YD.—Front 2½" Molybdenum Cast Steel, two part Van Port Reversible Teeth. Can be used on 68-C and 70-C Machines. Brand New. D-1.

2 3 CU. YD.—Front 2½" Molybdenum Cast Steel, two part Van Port Reversible Teeth. Can be used on Model 100-B, 68-C, 70-C Machines. Brand New. D-2.

1 3½ CU. YD.—Front 2¾" Nickel Chrome Steel, two part Van Port Reversible Teeth. Can be used on Model 88-C, 95-C, Class 180. Brand New. D-3.

1 4 CU. YD.—Front 2¾" Molybdenum Cast Steel, two part Van Port Reversible Teeth. Has seen some service but in good condition. Can be used on Model 100-C, 120-B. D-4.

1 4½ CU. YD.—Lip 2¼" Manganese Steel, two part Reversible Manganese Teeth. Can be used on Model 88-C, 110-C. Brand New. D-5.

3 6 CU. YD. Molybdenum Steel Front, Annealed Cast Steel Back, two part Reversible Van Port Teeth. Can be used on 225-B and 320-B. Brand New. D-11.

1 8 CU. YD.—Front Molybdenum Steel, two part Van Port Reversible Teeth. Can be used on Model 320-B. Slightly Used but excellent condition. D-6.

Dragline Buckets

1 1¾ CU. YD. OMAHA STANDARD. Rebuilt. Approximate weight 3,800 lbs. DB-7.

1 2 CU. YD. BUCYRUS-ERIE TYPE "U" RED ARCH. Rebuilt. Approximate weight 3,700 lbs. DB-6.

1 2 CU. YD. BUCYRUS-ERIE TYPE "U" RED ARCH. Rebuilt. Approximate weight 3,700 lbs. DB-8.

1 2½ CU. YD. BUCYRUS-ERIE INSERTED TOOTH. Rebuilt. Approximate weight 6,500 lbs. DB-9.

1 2½ CU. YD. OMAHA STANDARD. Rebuilt. Approximate weight 5,400 lbs. DB-10.

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BRAND NEW

Will Make That Old Shovel Work Like New.

Can Also Be Used for Miscellaneous Service.

Vertical Type

9 36"x82½"—26 H.P.—142 lb. Working Pressure. Mass. Std. Will fit Type A. B-1.

4 42"x88"—35 H.P.—144 lb. Working Pressure. Mass. Std. Will fit Type B Shovel, B-2.

1 44½"x88½" fitted with extended fire box for burning wood. Can be used for coal or coke. 37 H.P.—144 lb. Working Pressure. ASME Std. Can be installed on Type B Shovel. B-3.

1 44½"x88½"—37 H.P.—145 lb. Working Pressure. Canadian Std. Will fit Type B Machine. B-4.

1 44½"x88½"—37 H. P.—147 lb. Working Pressure. Mass. Std. Will fit any Type B B-5.

1 46½"x88½"—37 H.P. 150 lb. Working Pressure. Special Wood Burning. Mass. Std. Will fit any B-2 or B-3 Machine. B-7.

2 46½"x88½"—37 H.P.—150 lb. Working Pressure. Mass. Std. Will fit B-2 or B-3 B-8.

3 46½"x110"—40 H.P.—155 lb. Working Pressure. Special Wood Burning Fire Box. ASME Std. Will fit any B-2 or B-3 B-9.

1 48"x7'10"—52 H.P.—150 lb. Working Pressure. Mass. Std. Will fit any 31-B B-10.

1 54"x100"—41 H.P.—125 lb. Working Pressure. ASME Std. Will fit B-2 or B-3. B-11.

2 58"x7'9"—70 H.P.—150 lb. Working Pressure. Mass. Std. Will fit 42-B Machine. B-12.

Locomotive Type

3 44"x17'—75 H.P.—125 lb. Working Pressure. ASME Std. Will fit Model 68-C. B-13.

1 44"x18'—88 H.P.—125 lb. Working Pressure. ASME Std. Will fit Model 70-C B-14.

1 54"x9'7"—70 H.P.—125 lb. Working Pressure. Canadian Std. Will fit Model 50-B Machine. B-15.

2 54"x11'3"—92 H.P.—125 lb. Working Pressure. ASME and Mass. Std. Will fit Model 50-B Machine. B-16.

1 54"x18'—127 H.P.—140 lb. Working Pressure. ASME Std. Will fit Model 103-C B-17.

ELECTRICAL EQUIPMENT

MOTOR—GENERAL ELECTRIC—3 phase, 25 cycle, 550 volt, 1500 RPM., 90 HP., BRAND NEW. EE-1.

50 KW MOTOR-GENERATOR SET—GENERAL ELECTRIC—consisting of 3 phase, 60 cycle, 440 volt, 1170 RPM., 75 HP., Induction Motor connected to 50 KW, 250 volt, 1200 RPM., Generator, including suitable rheostat and compensator. BRAND NEW. EE-2.

COMPENSATOR—GENERAL ELECTRIC—75 HP., 2200 volt, 3 phase, 25 cycle, manual type. BRAND NEW. EE-3.

TRANSFORMER—GENERAL ELECTRIC — 5-KVA. 2200-3810 volt primary, 440-220 volt secondary—3 phase, 60 cycle, with cast iron tank and cover, including specially fastened bushings to prevent oil leakage. BRAND NEW. EE-4.

GENERATOR — WESTINGHOUSE — 125 KW, 250 volts, 500 amperes. Direct Current. 440 RPM. Includes two outboard bearings. BRAND NEW. EE-5.

MOTORS (2) — GENERAL ELECTRIC — 21.5 H.P. 3 phase, 60 cycle, 440 volt, 900 RPM. Totally enclosed—ball bearing. BRAND NEW. EE-6.

LIGHTING PLANTS

1 1 KW MOON TURBO STEAM GENERATOR for Lighting Plant. 32 Volt. New. LP-1.

1 1 KW MOON TURBO STEAM GENERATOR for lighting Plant. 110 Volt. New. LP-2.

1 1 KW MOON TURBO STEAM GENERATOR for Lighting Plant. 110 Volt. Used. LP-3.

1 1½ KW MOON TURBO STEAM GENERATOR—110 Volt Light Plant. Slightly Used. LP-5.

AIR COMPRESSORS

2 11"x11"x12" STEAM DRIVEN LOCOMOTIVE TYPE, Westinghouse air compressors with fittings. Brand New. AC-1.

2 11"x11"x12" STEAM DRIVEN LOCOMOTIVE TYPE, Westinghouse air compressors with fittings. Used. Make offer. AC-2.

ENGINES

Designed especially for application to Excavating or similar Equipment. Can be used for stationary or semi-stationary service.

Diesel

10 BRAND NEW NON-REVERSIBLE ATLAS DIESEL ENGINES—4 cylinders, 7" bore x 8½" stroke, 75 HP at 600 RPM, 4 cycle, Vertical—valve in head type. Includes radiator, fan and air cleaners. DE-1.

2 BRAND NEW NON-REVERSIBLE ATLAS DIESEL ENGINES—6-cylinder, 9" bore x 10½" stroke, 150 HP at 450 RPM, 4 cycle, Vertical—valve in head type. Dust proof, Oil tight crank case and forced lubricating system. Full equipment. Also auxiliary air starting equipment. DE-2.

1 REBUILT-BRAND NEW CYLINDERS—120 HP 14"x17" TWO CYLINDER FAIRBANKS-MORSE-DIESEL ENGINE, SPEED 257 R.P.M. —Fuel Tank, Air Tank, Water circulating Pump, Four cylinder starting Engine belted to Compressor and Hand Pump for filling fuel tank included. DE-4.

4 BRAND NEW NON-REVERSIBLE ATLAS DIESEL ENGINES—3-cylinder, 6" bore x 8" stroke, 45 HP. at 650 RPM. DE-5

3 BRAND NEW NON-REVERSIBLE ATLAS DIESEL ENGINES—4-cylinder, 6" bore x 8" stroke, 60 HP. at 650 RPM. DE-6

Steam

1 12½"x16" link reversing type for Railroad Shovel. ME-1.

2 4½"x5" reversible—20.8 HP at 400 RPM. 100 lb. Pressure. ME-2.

1 4¾"x5" reversible—23.2 HP at 400 RPM. 100 lb. Pressure. ME-3.

2 5"x5" reversible—25.6 HP at 400 RPM. 100 lb. Pressure. ME-4.

1 "LITTLE TUGGER" INGERSOLL RAND STEAM HOIST ENGINE No. 1-H-5-2½ H.P. ME-5.

CAT MOUNTINGS

Give that Old Wheel Machine New Life

1 REBUILT SPUR GEAR CAT MOUNTING—Interchangeable with Type B or Type B-2 Bucyrus-Erie traction wheel or cat mounting. CM-1.

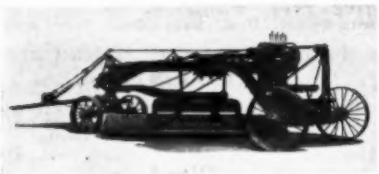
PUMPS

1 NB—3 STAGE CENTRIFUGAL PUMP—2" suction and discharge—bronze impeller and shaft—capacity 100 gallons per minute at 240' head operating at 1720 RPM or 270' head at 1780 RPM. Now equipped for belt drive but can be operated by 15 HP Electric Motor. ME-6.

Equipment You Ought to Know About

(Continued from page 411)

Caterpillar Tractor Company, Peoria, Illinois. The control unit is the same as the one used so successfully on the No. 77 grader. A one cylinder, air-cooled gasoline engine furnishes power to control the actions of the grader. Seven power control levers, grouped in front of the operator,



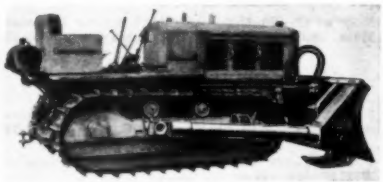
have automatic releases to protect the machines when the limit of any adjustment has been reached.

The machine has an 8-inch ship channel steel frame, adjustable bronze lift gears running on steel worms, ball and roller bearings throughout the lifting mechanism, one piece structural steel circle with carbon steel bladebeams riveted clear around the front, drop forged chrome-nickel steel axle spindles and nonbuckling universal draft hitch. Its weight is 10,200 pounds. The 12-foot blade, which is standard, can be set to a maximum height of 9 feet and an angle of 70 degrees for bank cutting. It has a side reach of 62 inches outside the rear wheels when set at a 45 degree horizontal angle.

A hand controlled No. 66 grader weighing 9,763 pounds is also available, identical with the exception of power control and weight.

Athey Announces New Hydraulic Bulldozer

A NEW BULLDOZER for mounting on Caterpillar Thirty-five and Fifty tractors has recently been announced by *Athey Truss Wheel Company,* 5631 West 65th Street, Chicago. The unit is exceptionally compact and rugged, readily dismountable and easy to install. It incorporates a number of un-



usual advantages which mean fast, clean operation with exceptional durability and flexibility. Among the features of this new bulldozer are: moldboard type blade (furnished with detachable end cutting edges when specified), convertibility to full floating blade, finger-tip control from the tractor operator's seat, etc. The hydraulic pump may be disengaged when not required and is equipped with a combination of automatic release and by-pass valve for relieving excessive operating loads. For complete specifications write Athey Truss Wheel Company mentioning the *Excavating Engineer.*

Improvements in Eye Protection

THE LATEST advances in eye protection for oxyacetylene welding and cutting have been embodied in the new Oxweld No. 15 welding spectacles and a new lens, Type AA, according to an announcement by *The Linde Air Products Company, 30 East 42nd, Street, New York.* Among the advantages claimed are natural canvas-bakelite frame, 50 mm. diameter lenses, exceptional width bows covered with insulating material, non-flammable frame, etc.

The new Type AA lens, made in light, medium and dark green shades, has high protective qualities, and its transmission percentages meet the most rigid specifications for eye protection.

POSITIONS WANTED

Positions wanted advertisements will be run under this heading for 5 cents per word, minimum charge $1.00. Advertisements for help wanted free of charge.

Address all box numbers c/o Excavating Engineer at South Milwaukee, Wisconsin

SHOVEL OPERATOR

Three years' experience on Bucyrus-Erie Gas +Air on basement excavating, highway and street grading. Also eight years' experience on Erie, Marion, Bucyrus, steam shovels. Will go anywhere in U. S. A. or Canada. Can do own repairing. A-1 reference. Married. Present location Minnesota. Box 5801.

SUPERINTENDENT

20 years operating and in charge of heavy strip mine and quarry equipment. 45 years of age. Can furnish references from any former employer and the largest manufacturer of excavating equipment in America. Can take full charge on reasonable notice. Box 5901

EXPERIENCED DRAGLINE OPERATOR

Fifteen years experience on Bucyrus-Monighan, P&H, Northwest and other makes of Steam, Diesel, gas and electric draglines on levee work and phosphate mines. Hold three sets civil service papers with ratings of 70%, 85%, and 100%. Married but can go anywhere. Furnish excellent references. Present location, Louisiana. Box 5903

DRAGLINE OPERATOR

25 years experience on steam draglines on construction work. Prefer operating dragline. Can do own repair work. Reliable references furnished. Present location, Indiana. Box 5701.

DRAGLINE-SHOVEL OPERATOR

10 years' experience on Bucyrus-Erie, Link Belt, Marion and Northwest machines, steam, gasoline and Diesel powered. Have worked on highway and railroad grading, quarry excavation and drainage irrigation. Willing to go anywhere in U. S. A. Also have 2 years' machine shop experience. Can do own repairing and furnish A-1 references. Present location Florida. Box 5702.

OPERATOR

Ten years experience as shovel, clamshell, backdigger and dragline operator on Osgood, Thew, Bucyrus-Erie, Northwest and Bay City machines. A-1 references. Present location New York State. Box 5902

SHOVEL OPERATOR

5 years experience on Lorain, Northwest, Osgood, and Bucyrus-Erie Gas, Diesel and steam machines. Can do own repair work. Single and willing to go anywhere in U. S. A. or Foreign countries. Can furnish excellent references. Box 5904

OPERATOR

With 26 years experience on Monighan, Bucyrus-Erie and other makes on all kinds of projects. Can do own repair work and furnish good references. Willing to go anywhere. Present location Illinois. Box 5905.

SUB-CONTRACTORS WANTED

New England contractor has several months government work and in addition to his own equipment considers renting six or more gasoline driven draglines, 40′ to 60′ booms and buckets of 1 to 2 cubic yards capacity. Gasoline for dragline will be supplied by government. All other expense paid by owner of machine. Must be ready to ship machine on 48 hours notice. Box 6001

DRAGLINE-SHOVEL OPERATOR

Have 18 years experience on drainage and highway work. Will go anywhere in U.S.A. Married, can do own repair work and furnish reliable references. Present location Florida. Box 5302

STRIPPING CONTRACTOR WANTED

By owner of 120 acres of good coal near Canton, Illinois, 18 to 40 feet overburden, 5½ foot vein of coal. Now opened with box cut of 500 feet. 3 and 7 miles to shipping point over gravel road. Can sell all coal; can get out at good price. Would make attractive offer on shares to owner of stripping shovel. Box 6000

WANTED

Position as crane, dragline or shovel operator, gas or steam. Have engineer's License and have operated since 1907. Can operate practically all types. Can furnish excellent references. Present location Texas. Box 5705

Book Reviews

Ingersoll-Rand Company, 11 Broadway, New York, has issued a new catalogue, entitled **Portable Compressors, Tools, and Equipment**, which is designed to assist all users of compressed air. It describes and illustrates a wide range of machines and tools that have many applications, and lists the types of work for which each unit is particularly fitted.

Recently developed products such as the two-stage, air-cooled portable compressor, the air-cooled stationary "Motorcompressor," and "Jackbits" are included, together with the complete line of I-R rock drills, paving breakers and pile drivers, drill steel sharpeners and oil furnaces, pneumatic tools, hoists, and boring machines.

The booklet also shows stationary compressors, Diesel engines, aftercoolers, air receivers, and other I-R equipment. The catalogue is designated as Form 1604E and free copies of it are obtainable at any Ingersoll-Rand office.

Gardner-Denver Company, Quincy, Illinois, has recently published new bulletins on the **Model 11 Sinker Drill**, on **Paving Breakers and Clay Diggers** and on **Light Weight Drills — Models 90, 93 and 95.** These three bulletins are well illustrated and contain specifications which will be of use to any reader interested in this type of equipment.

The Caterpillar Tractor Company recently published a profusely illustrated 48-page catalog entitled **Special Equipment for your Caterpillar Tractor.** This catalog illustrates and describes some 30 odd items of equipment which add to the tractor's usefulness. Any reader interested should write direct to **Caterpillar Tractor Company**, Peoria, Illinois, mentioning **Excavating Engineer.**

The U. S. Bureau of Mines, Department of Commerce announces the publication of the **Minerals Yearbook.** This volume of 819 pages furnishes timely statistical information regarding all commercially important minerals and the material present is divided equally between descriptive text and charts and tables. The **Minerals Yearbook** takes the place of "Mineral Resources of the U. S." which has been issued annually for over half a century. The new publication will be more convenient than the publication it replaces. It will be issued shortly after the close of the year with which it deals. The price is $1.25. Orders should be sent to the Superintendent of Documents, Government Building Office, Washington, D. C.

Chain Belt Company, Milwaukee, has prepared a new 16 page catalog, bulletin No. 240, covering the line of Rex Speed Prime Pumps. Some of the most useful data ever placed in the hands of the pump user will be found in this book, according to this manufacturer. A sample problem has been prepared, accompanied by the necessary simplified charts and tables, to enable the contractor to "figure" the right pump for his particular job. For a copy of this catalog, write Chain Belt Company, mentioning Excavating Engineer.

FOR SALE

RATES:	First insertion rate per column inch	Repeat insertions (no change in copy) rate per column inch
Up to 3 inches	$4.50	$4.00
Over 3 and up to 7 inches	4.25	3.75
Over 7 inches	4.00	3.50

Rates are net (no commissions, no discounts) and payable in advance of publication. Send your remittance with insertion order and copy.

Address all box numbers c/o Excavating Engineer at South Milwaukee, Wisconsin

Small Shovels
Under 2 Yards

1 USED TYPE "B" STEAM SHOVEL, shop No. 2400; caterpillar mounted; 19 ft. 8 in. boom, 16 ft. dipper handle, ¾ yard dipper. Good condition. Can be inspected any time. Located Sturgis, Michigan. Bargain price. Box 418SS

MARION MODEL 21 COMBINATION HIGH LIFT STEAM SHOVEL, ¾-cubic-yard manganese steel dipper, 15-foot dipper handle, 20-foot shovel boom. Also includes 40-foot boom crane equipment including two drums. Boiler retubed and machine is in excellent operating condition. Location about 15 miles from Baltimore, Maryland. Price for immediate acceptance, subject to prior sale, f.o.b. present location—$1,800. Box 396-SS.

BUCYRUS ERIE So. Milwaukee, Wis.

OFFERS FOR SALE OR RENT

FACTORY REBUILT and USED SHOVELS--CRANES--DRAGLINES

Please send me full details on:

- ☐ Osgood 1½ yd. Steam Shovel — Bargain.
- ☐ Bucyrus-Erie 1030 —Gas ¾ yard shovel. Rebuilt.
- ☐ P & H 600 1-yd. Shovel-Dragline.
- ☐ Bucyrus-Erie 41-B steam 1¼-yd. Shovel. Good condition. Very low price.
- ☐ Osgood "Conqueror"—Gas Shovel.
- ☐ Monighan Dragline 60-foot boom. Priced right.

Name.....

Address.....

MARION MODEL 32, shop No. 5459, mounted on "cats," steam-powered, 1¼-cubic-yard dipper, 24-foot boom, 17-foot 6-inch dipper handles. Box 82-SS.

BUCYRUS-ERIE TYPE "GA-2" GAS+AIR SHOVEL, shop number 4117, mounted on spur gear drive caterpillar trucks, and equipped with a 24-foot boom; 18-foot, 4-inch dipper handle; 1-cubic-yard manganese cast front socket inserted tooth dipper; power boom hoist; air self-starter, and all equipment and appurtenances in accordance with the specifications of Bucyrus-Erie Company, f.o.b. cars shipping point Virginia. Box 126-SS.

P. & H. MODEL 206 Gasoline Combination Shovel and Clamshell machine. Good condition. Located vicinity Chicago. Box 336-SS.

20-B BUCYRUS-ERIE STEAM SHOVEL, serial number 4000; caterpillar mounted; 18-foot boom, 12-foot 6-inch dipper handle, 1-yard dipper; shipped new in 1923; located western Missouri. Bargain. Box 241-SS.

THEW "O" ¾-cubic-yard gas shovel rebuilt 1931 and mounted on new center drive "cat". Box 345-SS.

CHEAP!

Two 20-B Bucyrus steam shovels. Located Aurora, Illinois. Price each $1500.

30-B Bucyrus steam shovel. Located Charleston, Mississippi. Price $1500. Box 303-SS.

ONE TYPE "B" BUCYRUS-ERIE STEAM MACHINE, mounted on "cats", ¾-cubic-yard dipper, shop number 2301, 19-foot boom and 16-foot dipper handle. Box 83-SS.

BRAND NEW PAGE DRAG SHOVEL EQUIPMENT suitable for application to Bucyrus-Erie 1030, 1035, or 32-B machines now in the field, consisting of 17-foot 1½-inch boom, 11-foot dipper handle, and two ¾ cubic-yard dippers; one 38-inches wide over cutters—the other 49½-inches wide over cutters, together with auxiliary A frame and ropes. Priced below cost. Box 381-SS.

USED P&H MODEL 700 gasoline, combination shovel-dragline, shop number 3007, including 1¼-cubic-yard drag scraper bucket. Dragline boom 40-foot plus 10-foot extension, shovel boom 25-foot 10-inches, dipper handle 19-foot 3-inches, dipper 1¼-cubic-yard. Engine Waukesha Type WL 4 cylinder 6¼"x7". Good condition. Some repair parts on hand. Machine located Tilleda, Wisconsin. Box 378-SS.

BUCYRUS-ERIE 20-B steam shovel ¾-yard Dipper, $850. Chicago territory. Box 348-SS.

FOUR TYPE B BUCYRUS-ERIE STEAM SHOVELS. Good operating condition. $1000 each. Box 328-SS.

ONE 18-B BUCYRUS-ERIE, ⅞-yard dipper on full revolving caterpillars. Box 182-SS.

OSGOOD "CONQUEROR" GAS COMBINATION SHOVEL-CLAMSHELL. Brand New. LeRoi 6-cyl. Engine. Excellent condition. Box 412-SS.

NORTHWEST SHOVEL, model 105, caterpillar mounted, 24-foot boom, 1-cubic-yard dipper, 16-foot dipper handle. In good condition. Price $4,500, f. o. b. Utica, New York. Box 84-SS.

FOR SALE

Address all box numbers c/o Excavating Engineer at South Milwaukee, Wisconsin

Small Shovels
Under 2 Yards
Continued

BUCYRUS-ERIE SLIGHTLY USED ½-CUBIC YARD Rope crowd gasoline shovel. Will demonstrate. Box 282-SS.

REBUILT GA-2 BUCYRUS-ERIE SHOVEL mounted on single shaft caterpillar, 1¼-cubic yard inserted tooth dipper, 22-foot 6-inch boom, 16-foot dipper handle, starter. Carries guarantee of new machine. Box 43-SS.

Lorain 75-B shovel purchased new February, 1932. Worked only six months—just like new. Located in northern New York State. Box 414-SS

P&H MODEL 204. Shop number above 2200 combination Shovel Clamshell. 19' shovel boom, 14' 6" dipper handles, ½ cubic yard dipper, 35' clamshell boom, ½ cubic yard Owens Type M digger type bucket. Both front end equipments less than one year old. Excellent condition. Box 284-SS.

BYERS BEARCAT, Model 27, gasoline ½-cubic-yard Skimmer scoop, crane-clamshell and drag shovel with front opening dipper. Engine—4-cylinder, 4"x5" Hercules Model OX. Machine new July 1928. Excellent condition. Box 293-SS.

TYPE B BUCYRUS-ERIE COMBINATION HIGH LIFT STEAM SHOVEL, 19-foot 8-inch boom, 16-foot dipper handle, ¾-cubic yard dipper, power boom hoist and 36-foot boom clamshell equipment complete. Located central Indiana. Price as is, f.o.b. present location $2,000. Box 311-SS.

20-B BUCYRUS-ERIE STEAM SHOVEL. Machine No. 4145.

BUCYRUS-ERIE GAS + AIR CRANE with 40-foot boom, ¾-yard Page Dragline bucket. Fairleads and shovel boom, no dipper stick. Machine No. 4347.

TYPE B BUCYRUS-ERIE High Lift Steam shovel. Machine No. 3110. Box 373-SS.

BUCYRUS-ERIE 1030, ¾-cubic-yard rope crowd gasoline shovel. Factory rebuilt and guaranteed. Box 283-SS.

TYPE B-2 BUCYRUS-ERIE STEAM SHOVEL, number 9830, mounted on single shaft caterpillar type mounting. Equipped with 21-foot 3-inch boom, 16-foot dipper handle, ⅞-cubic-yard inserted tooth dipper. Boom hoist and Mass. standard boiler. Located vicinity of Boston. Reasonably priced. Box 345-SS.

BUCYRUS-ERIE brand new 1035 gasoline shovel, rope chain crowd. Also clamshell or dragline equipment. At price you cannot refuse to consider. Box 356-SS.

BUCYRUS-ERIE GAS + AIR Combination high lift shovel and dragline equipment. Chain drive. "Cats." Very good condition. Located vicinity Chicago. Box 337-SS.

BUCYRUS-ERIE GA-2 SHOVEL—Single Shaft Cat. 24' Boom, 18' Dipper Handle, 1 cubic yard Dipper. Good operating condition. Box 423SS.

BUCYRUS-ERIE MODEL 32-B Gas Chain Crowd Shovel—21' 6" Boom, 16' Dipper Handle, ⅞ yard Cast Front Inserted Tooth Dipper, Wisconsin six-cylinder 5"x6" Engine. Excellent condition. Box 422SS.

BUCYRUS-ERIE TYPE B High Lift Steam Shovel, Power Boom Hoist. Good condition. Box 425SS.

BUCYRUS-ERIE GA-2 High Lift Shovel—22'6" Boom, 16' Dipper Handle, 1¼ cubic yard Dipper, four cylinder 6¼"x8" Engine, Single Shaft Cat. Shop reconditioned. Bargain price. Box 426SS.

BUCYRUS-ERIE 37-B Gas Shovel—Single Shaft Cat, Chain Crowd, 21'6" Boom, 15' Dipper Handle, 1½ cubic yard Dipper. Field reconditioned. Wisconsin six cylinder 5¾"x6½" Engine. Suitable for high altitude. Kohler Light Plant, Electric Starter. Box 427SS.

BUCYRUS-ERIE D-2 Diesel High Lift Shovel—26' Boom, 17' Dipper Handle, 1 cubic yard Dipper, Atlas four cylinder 6½"x8½" Engine. Excellent condition. Box 428SS.

AMERICAN Gas Shovel—21' Boom, 15' Dipper Handle, 1 cubic yard Dipper, Waukesha four cylinder 6"x7" Engine. Bargain price. Box 429SS.

BAY CITY Chain Crowd Gas Shovel—15' Boom, 11' Dipper Handle, ⅜ cubic yard Dipper. Also 25' Boom Clamshell Equipment and ⅜ yard Clamshell Bucket. Excellent operating condition. Bargain price. Box 430SS.

BYERS BEARCAT Gas Shovel—16' Boom, 12' Dipper Handle, ⅜ yard Dipper, Hercules Gas Engine. Also 30' Boom Dragline Equipment. Good mechanical condition. Price right. Box 431SS.

P&H MODEL 208—45' Boom Dragline—100 HP Waukesha Gas High Altitude Engine. Good operating condition. Box 432SS.

P&H MODEL 207—40' Boom Dragline—Buda Gas Engine. Field reconditioned. Box 433SS.

P&H MODEL 600 Gas Shovel—20' Boom, 14'3" Dipper Handle, 1 cubic yard Dipper. Also 40' Boom Clamshell and Dragline Equipment available. 75 HP Waukesha Gas Engine. Bargain price. Box 434SS.

KOEHRING MODEL 1 Gas 30' Boom Crane—4½"x5" Wisconsin Engine. Box 435SS.

OSGOOD Steam Shovel—21'9" Boom, 16' Dipper Handle, 1½ cubic yard Dipper. Good operating condition. Box 436SS.

BUCYRUS-ERIE 37-B—1½ cubic yard Shovel, 21'6" Boom, 15' Dipper Handle, Wisconsin six cylinder Gas Engine, Battery Lighting Plant. Factory rebuilt. New machine guarantee. Box 438SS.

BUCYRUS-ERIE GA-2 SHOVEL—22'6" Boom, 16' Dipper Handle, 1¼ cubic yard Dipper, Waukesha four cylinder 6¼"x8" Engine—Brand New cylinders. Factory rebuilt. New Machine Guarantee. Box 439SS.

BUCYRUS-ERIE 43-B—1¾ cubic yard Chain Crowd Shovel, 22' Boom, 15' Dipper Handle, Wisconsin six cylinder 6"x7" Engine. Factory rebuilt. New machine guarantee. Box 440SS.

LORAIN 75-B Shop No. approximately 5000—21' Boom, 18' Dipper Handle, 1¾ cubic yard all cast Dipper, automatic Dipper Trip, Standard center drive Cat, Power Boom Hoist, four cylinder Waukesha 6¼"x8" Gas Engine. New July, 1930. Located Strawn, Texas. Excellent mechanical condition. Box 441SS.

HIGH LIFT TYPE B-2 steam shovel No. 3867 mounted on caterpillars and equipped with 19'9" boom, 16' dipper handle, ⅞ cu. yd. inserted tooth dipper, two speed, heavy counterweight, and boom hoist. Located in New York State (at or near Pine Bush). Would accept any reasonable offer. Box 448 SS.

TYPE GA-2 SHOVEL NO. 10937 mounted on single shaft caterpillar mounting and equipped with 24' boom, 16' dipper handle, 1¼ cu. yd. inserted tooth dipper, electric starter and boom hoist. Located in Massachusetts—now working. Can be purchased at very low price. Box 445 SS.

TYPE GA-2 SHOVEL NO. 9774 mounted on caterpillars and equipped with 24' boom, 18'4" dipper handle, 1 cu. yd. inserted tooth dipper, and air starter. Located in Massachusetts—now working. Can be purchased at very low price. Box 446 SS.

INDUSTRIAL BROWN-HOIST MODEL "H"—50' Boom, Steam 8 Wheel Locomotive Crane—50,000 lb. capacity. Good operating condition. Located vicinity Chicago. Box 442SS.

BUCYRUS-ERIE TYPE B-2 High Lift Steam Shovel and 40' Boom Clamshell Equipment. Single Shaft Cat. Good operating condition. Box 420SS.

BUCYRUS-ERIE GA-2 SHOVEL—24' Boom, 16' Dipper Handle, 1 yard Dipper, Single Shaft Cat, Massachusetts Air Tank. Excellent condition. Box 421SS.

P&H MODEL 600—1-yard Gasoline Shovel. Three years old. Excellent condition throughout. Just been thoroughly overhauled. Will sacrifice at bargain to responsible buyer. Located in Wisconsin. Box 363-SS.

BUCYRUS-ERIE 41-B STEAM SHOVEL—21 foot boom, 15 foot dipper handle, 1¼ cu. yd. dipper. Good operating condition. Box 406-SS

Small Draglines
Under 2 Yards

BUCYRUS-ERIE Practically New 45-B Diesel—75' Boom Dragline, no bucket. Buda Diesel Engine 6-cylinder 6¼"x8¾". Electric starter. Kohler Light Plant. Box 444 SD.

BUCYRUS-ERIE D-2 DIESEL—40' Boom Dragline, used on light work about 6 months since rebuilding. Excellent condition. Located Central Ohio. Box 443 SD.

MONIGHAN 60 FOOT BOOM DRAGLINE mounted on 1-W walking device—Waukesha 5¾x8, 4 cyl. gas engine, also 1¼ yd. Page bucket. Good operating condition. Box 408-SD

P & H Model 206 B Dragline. Good operating condition. Very favorably priced. Box 390-SD.

BUCYRUS-ERIE GAS+AIR combination high lift dragline and shovel. Chain drive. "Cats." Excellent condition. Located vicinity Chicago. Box 337-SD.

BUCYRUS-ERIE E-2 DIESEL DRAGLINE, caterpillar mounted, 50-foot boom, 1¼-cubic-yard Omaha bucket, Kohler lighting plant. Machine was new in July 1930 and has been used less than 6 months. Box 248-SD.

P&H MODEL 700 USED GASOLINE COMBINATION DRAGLINE-SHOVEL, shop number 3007, 40-foot dragline boom plus 10-foot extension and 1½-cubic-yard drag scraper bucket. 25-foot 10-inch shovel boom, 19-foot 3-inch handle and 1¼-cubic-yard dipper. Waukesha Type WL 4 cylinder 6¼"x8" engine. Good condition. Some repair parts on hand. Machine located Tilleda, Wisconsin. Box 378-SD.

30-B BUCYRUS-ERIE DIESEL DRAGLINE with 40-foot boom and 1-cubic-yard bucket located in Alabama. Box 91-SD.

P & H MODEL 700 DRAGLINE; number 2894 equipped with a 50-foot boom, light 1½-cubic-yard drag bucket, electric light plant, and powered with 4-cylinder Atlas Diesel engine. Box 189-SD.

P & H DRAGLINE MODEL 700; number 2456 equipped with a 50-foot boom, light 1½-cubic-yard drag bucket, electric light plant, and powered with a Waukesha gasoline engine. Box 190-SD.

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One practically new Bucyrus-Erie Model E-2 Dragline, Diesel driven, equipped with 50' boom and 1½-yard Omaha dragline bucket, now located at Shenandoah, Iowa. Box 244-SD.

P&H MODEL 600 GAS DRAGLINE. 40 foot boom. 75 H.P. Waukesha gas engine. Also available clamshell equipment; shovel equipment with 20 foot boom, 14 foot 3 inch dipper handle and 1 cubic yard dipper. Bargain price. Box 434SD.

BUCYRUS-ERIE 30-B Diesel—40' Boom Dragline Box 437SD

BYERS BEARCAT GAS DRAGLINE with 30 foot boom. Hercules gas engine. Also shovel equipment including 16 foot boom, 12 foot dipper handle and ⅜ yard dipper. All in good mechanical condition. Price right. Box 431SD.

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Small Clamshells and Cranes
Under 2 Yards

TYPE B CLAMSHELL MACHINE NO. 2609 mounted on caterpillars and equipped with 40' clamshell boom and necessary equipment for clamshell operation (but not including clamshell bucket). Located in Connecticut. Would accept any reasonable offer. Box 447-SCC.

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GENERAL 35-FOOT BOOM CLAMSHELL MACHINE and ½-cubic-yard Lakewood bucket. Equipped with four cylinder Buda gasoline engine. Machine new September 1929. Box 335-SCC.

P&H MODEL 600 GASOLINE CLAMSHELL MACHINE. 40 foot boom. 75 H. P. Waukesha gas engine. Also dragline equipment and shovel equipment including 20 foot boom, 14 foot 3 inch dipper handle and 1 cubic yard dipper. Bargain price. Box 434SCC.

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BUCKEYE CLAMSHELL-CRANE, gasoline driven, caterpillar mounted, equipped with 30-foot boom, ⅝-cubic-yard clamshell bucket, fairleads and backfiller scraper. Located in Milwaukee, Wisconsin. Box 371-SCC.

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McMYLER MODEL J. LOCOMOTIVE CRANE—35 Ton Steam. 50 and 75-ft. Boom. 1½ or 2-yd. buckets. New boiler and swinging engine recently installed. A real crane for long reach and heavy work. Thoroughly overhauled condition. $4,500.

Box 346-SCC.

Large Shovels and Draglines
2 Yards and Over

BUCYRUS-ERIE SHOP REBUILT 100-B STEAM SHOVEL; shop number 4890; 29-foot 6-in. boom, 20-foot handle; three-cubic-yard dipper. Can be inspected at So. Milwaukee, Wis. Priced to sell. Box 187-LSD.

50-B STEAM SHOVEL, Number 3946; equipped with 1½-cubic-yard dipper, 26-foot boom, also 1½-cubic-yard dragline bucket with 50-foot boom caterpillar mounted, equipped for burning oil, located at Texarkana, Ark. Price very reasonable. Box 112-LSD.

For Sale or Rent

ONE CLASS-14 STEAM DRAGLINE excavator. Number 3402, 70-foot boom, 2-cubic-yard bucket, caterpillar mounted, equipped for burning gas or oil. Priced very reasonable. Located at Grand Prairie, Texas. Box 110-LSD.

68-C BUCYRUS ELECTRICALLY OPERATED SHOVEL, equipped with 2½-yard manganese front dipper, 3 phase, 60-cycle, 440-volt motors, transformers, cable reel and approximately 1400 feet of cable, all in excellent condition. Reasonable price. Address Box 268-LSD.

6-YD. SHOVEL

BUCYRUS-ERIE 320-B electric shovel, Ward-Leonard control, 3 phase, 60 cycle, 2300 volts, equipped with 6-cubic-yard dipper, 35-foot boom and 58-foot handles. Is in good condition and may be inspected in operation. Reasonably priced. Box 279-LSD.

What Do You Bid On a

70-C STEAM SHOVEL located near Marietta, South Carolina, where it completed a railroad job? Bargain as supplementary shovel or as supply of spare parts.

88-C STEAM SHOVEL located in Kansas. Carefully laid up after completing season's work. 3½-yard dipper. Fine condition. Any reasonable offer accepted. Box 52-LSD.

FOR SALE

CLASS 14 STEAM DRAGLINE with 2-yard Page bucket. Location Iowa. Very good condition. Surprisingly low price f.o.b. cars.

ALSO

2-YARD MONIGHAN STEAM DRAGLINE in fair condition—cheap. Box 419LSD

70-TON STEAM SHOVEL mounted on "cats," caterpillars in good condition. Located near Hazelton, Pa. Box 162-LSD.

50-B STEAM SHOVEL, new March 1927. Shop number about 4950. Has 26-foot boom, 17-foot dipper handle and 2-cubic-yard dipper. Priced to sell. Box 240-LSD.

225-B OWNERS

You may be interested in a partial Bucyrus-Erie 225-B steam shovel located in Kentucky coal fields as a source of spare parts. No reasonable offer refused. Box 211-LSD.

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MONIGHAN DRAGLINE MODEL T, 2-cubic-yard 60-foot boom located near Wichita, Kansas, where it is now working. About seven years old. Has recently been thoroughly overhauled. Box 180-LSD.

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PRICED FOR QUICK SALE

50-B BUCYRUS-ERIE ELECTRIC DRAGLINE. Located in Texas. Box 416-LSD.

85-C STEAM SHOVEL, on caterpillar mounting, caterpillars in good condition, price $2,500. Located near Hazelton, Pa. Box 163-LSD.

For Sale or Rent

ONE CLASS-14 STEAM DRAGLINE excavator Number 3327 60-foot boom, 2-cubic-yard bucket, caterpillar mounted, equipped for burning gas or oil. Price very reasonable. Located at Turkey Creek, La. Box 111-LSD.

70-C BUCYRUS STEAM SHOVEL on Cats. Complete. In operating condition. Shop number 1712. Also one extra three-yard Manganese dipper. $2,000. Chicago territory. Box 347-LSD.

175-B STEAM SHOVEL No. 4090, equipped with 75-foot boom, 48-foot dipper handle and 3½-cubic-yard dipper. Machine is in very good condition. Oversize boiler. Box 148-LSD.

3-YD. SHOVEL

BUCYRUS 78-C, caterpillar mounted; three-cubic-yard dipper; shop number 3611. Boom rebuilt last year. Equipped with new 103-C boiler and will pass boiler inspection in any state. Shovel is in very good condition and is in operation at present time. Box 326-LSD.

BUCYRUS 320-B STEAM STRIPPING SHOVEL, shop number 4205, new in 1925, used less than four years. Located at Toronto, Ohio. Box 74-LSD.

BUCYRUS 80-B STEAM SHOVEL, shop number about 3800; 2-cubic-yard dipper; 48-foot boom; 32-foot dipper handle. "Cat" mounted. Priced to sell. F.o.b. cars. Box 255-LSD.

TYPE 175-B ELECTRIC, No. 794 equipped with 87' shovel boom, 48' dipper handle, 3½-yd. bucket, and dragline equipment including 125' boom, and 3½-yd. bucket. This machine was recently reconditioned and is in good operating condition. Present location, Connecticut. Box 263-LSD.

BUCYRUS 70-C, Shop number around 1500. Thoroughly overhauled. Good working condition. Eastern location. Box 299-LSD.

CLASS-24 BUCYRUS-ERIE STEAM DRAGLINE, shop number 912; 115-foot boom, 3½-cubic-yard Page bucket. Florida location. Box 73-LSD.

FOR SALE

Address all box numbers c/o Excavating Engineer at South Milwaukee, Wisconsin

Miscellaneous Equipment

TWO BARBER-GREENE LOADING MACHINES. Priced extremely low for quick sale. Box 415-ME.

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4 LA PLANT CHOATE 6-yard, all-steel, dump wagons. Equipped with wide iron wheels. Price $200.00 each. Chicago territory. Box 349-ME.

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Two 40-ton, 6-wheel switchers. Recently overhauled and rebuilt. Two 50-ton, 6-wheel switchers. In excellent condition. Location Chicago. Box 306-ME.

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8 BALDWIN, 17x24, straight drive standard gauge 45 ton locomotives. 54 inch boilers. Shop numbers from 32,750 to 34,611. Each one has passed State Boiler Inspection yearly. Boilers will stand cold water test of 240 lbs. At present in actual service in Minnesota mine.

2 BALDWIN Locomotives, 19x26, standard gauge, 6 wheel switching type, shop numbers 39534 and 39536. Box 152-ME.

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2—1-bag Gasoline Concrete Mixers
Pumps, Boilers, Jacks and Other Tools

For further particulars, Address Box 138-ME.

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For inquiry on supplies and equipment not advertised another postal card addressed to us is provided. Check plainly *only* those items in which you are interested. *Excavating Engineer* will be pleased to serve you in forwarding your inquiry to manufacturers.

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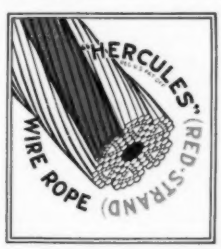

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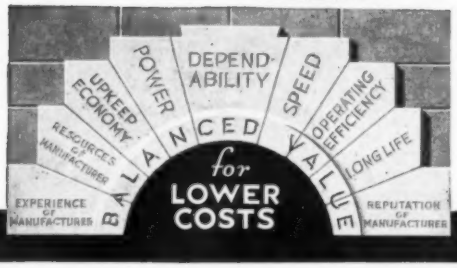

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655

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